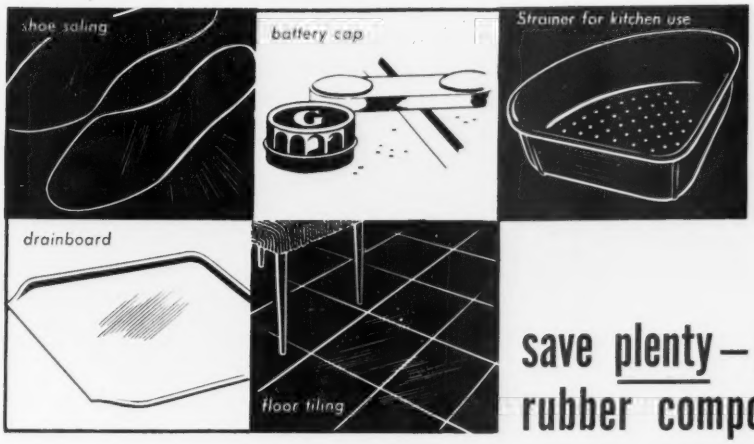
News about

B. F. Goodrich Chemical Company *raw materials*



save plenty—get improved rubber compounding, too!

...with Good-rite RESIN 50

HERE'S an easy-processing, reinforcing agent that cuts rubber compounding costs—and helps you get improved finished products.

First big advantage of Good-rite Resin 50 is that it provides a new and simple compounding approach to hardness problems. As an example—it's a means of filling in the gap between soft rubber compounds and ebonites.

Good-rite Resin 50 brings *more* advantages. It saves time by eliminating masterbatching. Your rubber compounds gain better flex life, higher elongation, improved abrasion resistance. They are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., especially on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

A white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. Send for technical information. Find out how Good-rite Resin 50 can give you *better* results at *lower* costs. Just write Dept. CA-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

A Merry Christmas
and a Happy New Year
From the Philblack* family far and near!

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 5, N. Y.

Phillips 66

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

* A Trademark

save 10%-15% plasticizer with PLIOVIC

EVERY tenth drum of plasticizer is a bonus you save with PLIOVIC — Goodyear's vinyl chloride copolymer. That's because internally plasticized PLIOVIC needs from 10% to 15% less plasticizer for equal modulus.

With PLIOVIC — in organosols, plastisols or general vinyl use — you get other desirable characteristics, too, such as lower processing temperatures, faster mixing and the ability to load more highly.

So turn to PLIOVIC — turn out high quality vinyls with strength and hardness comparable to those you are getting with your present resin—and save on scarce, costly plasticizer. Write today for full details and samples to:

Goodyear, Chemical Division
Akron 16, Ohio

Here's proof—
Maintained Quality — Reduced Use of Scarce, Costly Plasticizer

Resin	Plasticizer per 100 parts resin*	Ultimate Tensile	Average Hardness Shore B @ 78°
PLIOVIC	40.5	3000	67
Resin "X"	47.0	3100	65
Resin "Y"	46.0	3350	65
Resin "Z"	45.5	3000	68

*Plasticized to a modulus of 2000 psi at 100% elongation

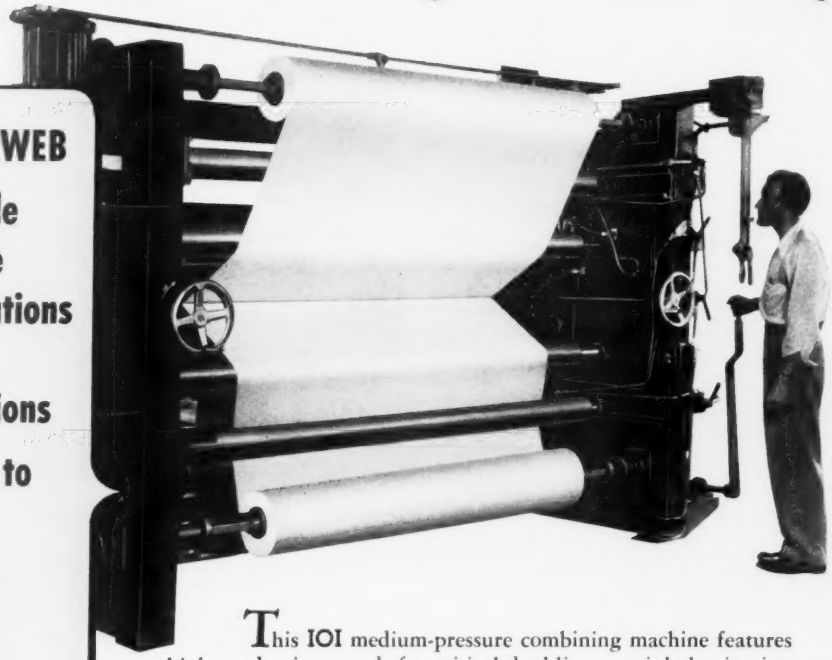
GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD" Every Sunday — ABC Network

PLIOVIC—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Designed and Built by IOI to improve your

Combining... Doubling... Laminating



WEB to WEB

In Double or Triple Combinations or Laminations

At Light to Heavy Pressure

At true Constant Tension and Variable Speeds

This IOI medium-pressure combining machine features high production speeds for critical doubling or triple-laminating operations. It is available in a variety of face widths, ranging from 36 to 96 inches. The machine pictured has a 90 inch face width.

Sandwich thickness is accurately controlled by micrometer roll spacers. All unwinding and windup heads are driven at true constant tension by a sensitive, variable-volume, variable-pressure fluid drive. Threading speeds down to 12 inches per minute are provided, as well as a reverse drive for easy stock handling and triple combining.

Lateral register is built into each unwinding head. Adjustable edge slitters are also incorporated. The unit will handle previously coated webs of pressure-sensitive materials. It can be used in conjunction with IOI fusing equipment for thermo-setting vinyl-based and other types of adhesives.

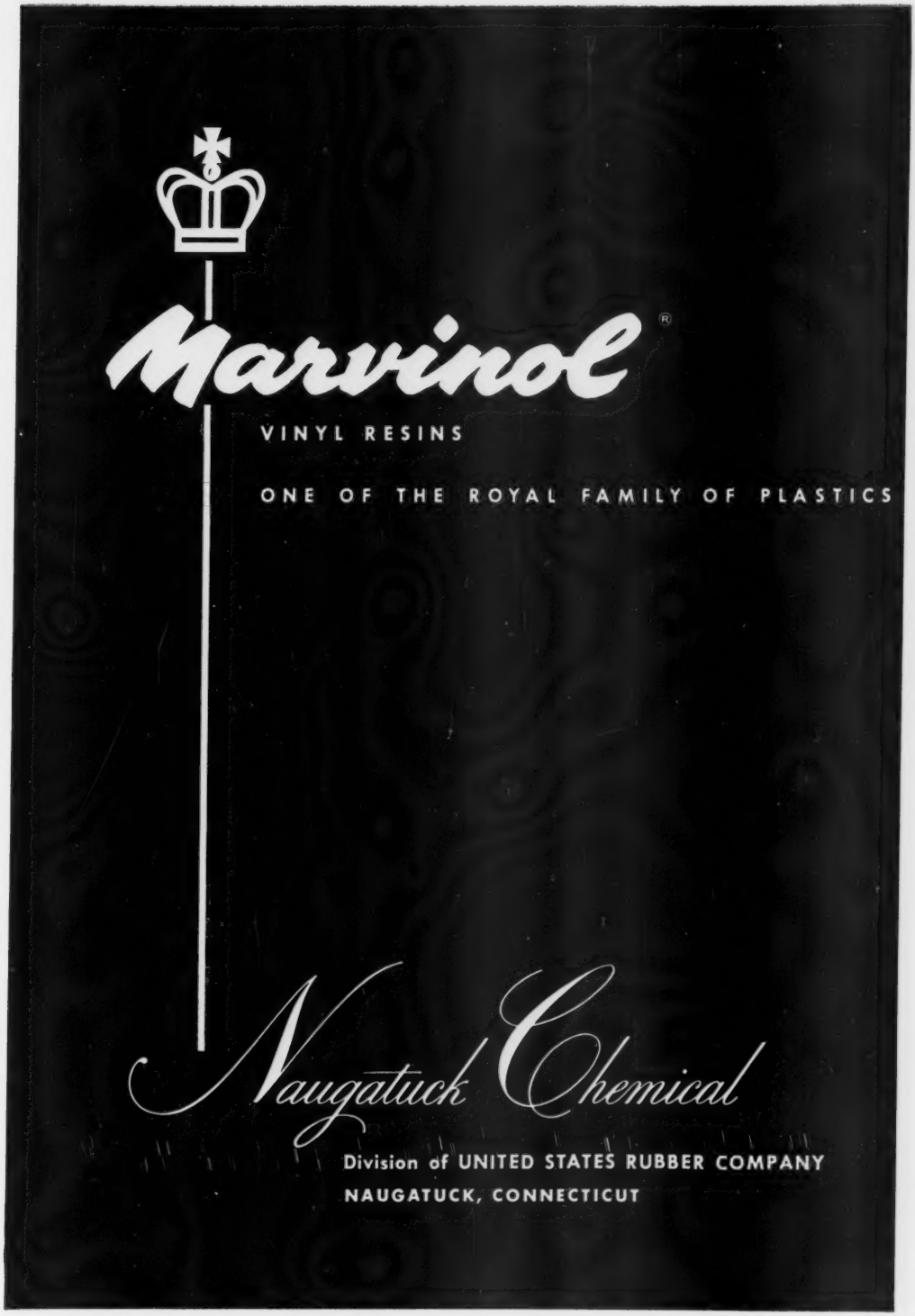
Variations of this machine's basic design are available for any roll face, operating speed or combining pressure.

An **IOI** engineer will be glad to show you how this machine can be applied to your particular processing requirements. Write on your business letterhead for further information.

INDUSTRIAL OVENS, INC.

IOI ENGINEERING VERSATILITY

13825 TRISKETT ROAD CLEVELAND 11, OHIO


Marvinol®
VINYL RESINS
ONE OF THE ROYAL FAMILY OF PLASTICS
Naugatuck Chemical
Division of UNITED STATES RUBBER COMPANY
NAUGATUCK, CONNECTICUT

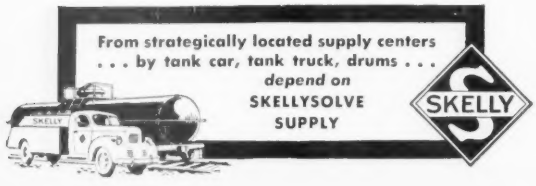
EVEN THIS DIDN'T STOP SKELLYSOLVE!

"Doc" MacGee says: For Kansas City, July 13, 1951, was "Black Friday." That was the fateful day the 1951 flood enveloped Kansas City's rich packing and industrial district. Yet enormous as that catastrophe was . . . with communications wrecked by the relentless flood waters . . . not one Skelly customer ran out of Skellysolve during those critical days.

A miracle? No. Skellysolve's dependability of supply can be explained by the strategic dispersal of Skellysolve refineries and bulk plants . . . a system proved by 20 years of success in "delivering the goods" . . . plus an indomitable "will to do" that inspires every member of the Skelly organization and gets things done!

Good example of that Skelly "will to do" is illustrated by this incident of the Great Flood: A crisis came when the raging waters covered rails . . . prevented the return of many Skellysolve tank cars. But immediate resourcefulness in rounding up and cleaning other tank cars in other locations kept Skellysolve going to our customers on schedule.

Moral: If you depend on your solvent supply to keep you going regardless of weather or disasters, it will pay you to use Skellysolve!



Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

(photo courtesy American Hard Rubber Company)

product improvement comes with PLIOLITE S-6

DRIP-PROOF, UNBREAKABLE *acid pail with exceptional toughness, resilience, chemical resistance. Manufactured by American Hard Rubber Company.*

USE PROVED Products

Outstanding example of product improvement is this new chemical bucket by the American Hard Rubber Company. Working with Goodyear technicians, this manufacturer developed a unique combination of rubber, other ingredients, and PLIOLITE S-6 (Goodyear's styrene-butadiene copolymer for rubber reinforcing).

The resulting compound gave a bucket that has:

- High chemical resistance
- Excellent resistance to impact
- Toughness over a range of temperatures
- Light weight
- Ease of processing in manufacture

Your product may well be improved through compounding with a blend of PLIOLITE S-6 and either natural or synthetic rubber—thanks to the versatility of such compounds.

PLIOLITE S-6 is in use in shoe soles, wire insulation, flooring, rubber hose and tubing and a wide range of molded and inflated rubber items—only a few of the potential uses of this leader in the field of copolymers for the reinforcement of rubber. For full details and sample, write:

Goodyear, Chemical Division, Akron 16, Ohio

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

What NEWTON
is to the Law
of Gravity . . .

TY·PLY

is to RUBBER-to-METAL ADHESIVES

TY-PLY **Q** for bonding Natural, GR-S, and Butyl

TY-PLY **S** for bonding Neoprene

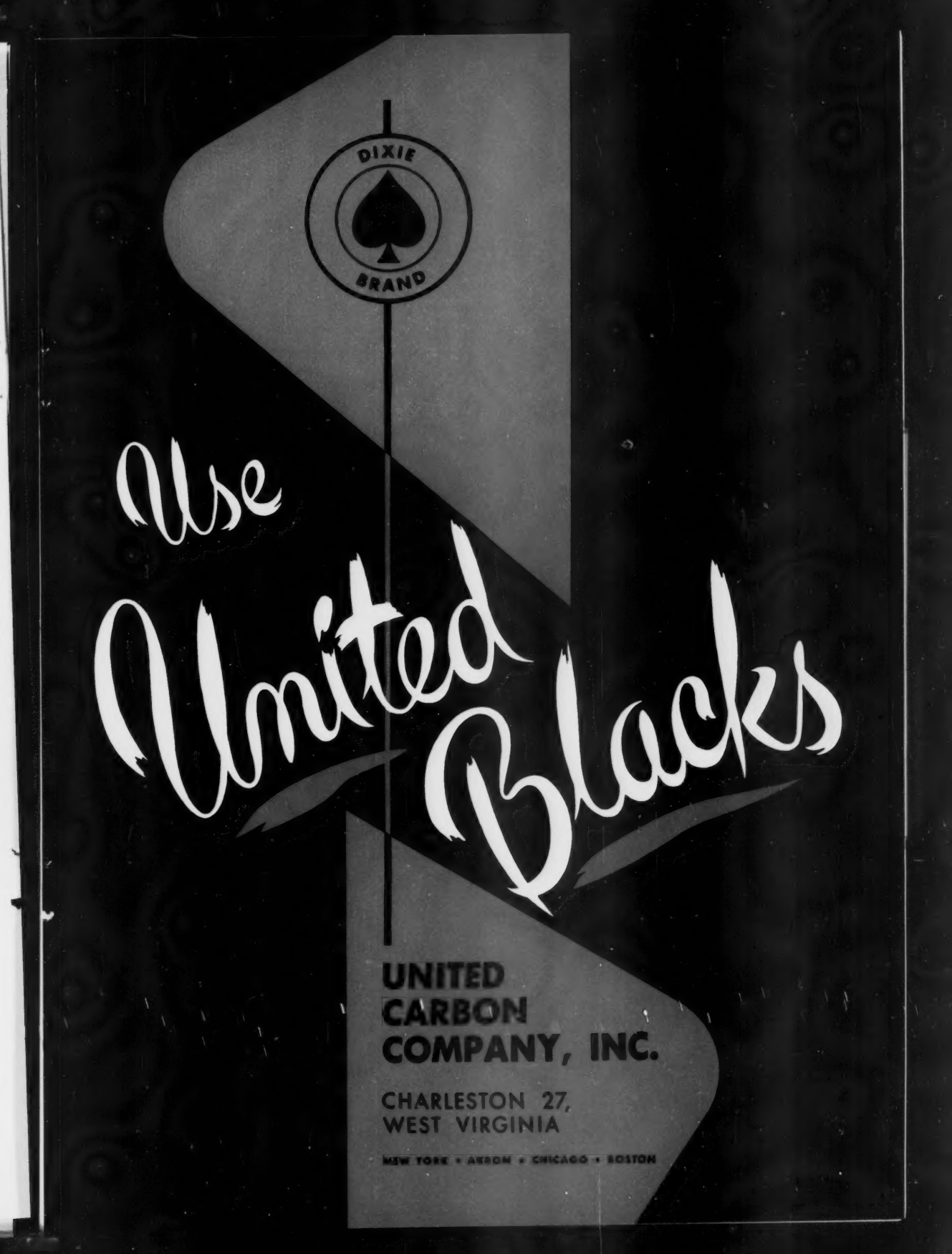
TY-PLY **BN** for bonding N-types

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface.

Marbon

MARBON CORP.
GARY, INDIANA
SUBSIDIARY OF BORG-WARNER

TY-PLY has stood the test of time . . . . since '39


DIXIE
BRAND
Use
United
Blacks
UNITED
CARBON
COMPANY, INC.
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DIXIE 20

at hand...

the qualities you need!

It is easier to stay in the lead when you standardize on United Blacks. For example, DIXIE 20 . . . an SRF black with extensive applications in the rubber industry. It is a black of dependable uniformity, outstanding for ease of processing, good plasticity and fast rate of cure. For maximum efficiency use DIXIE 20.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA. • NEW YORK • AKRON • CHICAGO • BOSTON

CANADA: CANADIAN INDUSTRIES, LIMITED

Schrader—first name in tire valves—supplies this *special* tractor tire valve that serves a dual purpose. It not only facilitates the addition of water and anti-freeze, but seals the air in the tire. Millions of these air-liquid valves are performing daily on farm tires throughout the world . . . another reason why tire manufacturers feel confident in Schrader-made Tire Valves.

A. SCHRADER'S SON, BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

Tires that work the fields

Our farm output is constantly increasing. Thanks to modern farming methods we are the best fed nation on earth. The majority of farm implements ride on pneumatic tires. And a necessity to proper tire performance is the valve that *locks* the air in the tire.

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

"Minute Man" in MALAYA

THIS young Malayan soldier is guarding a strategic area. Not an arsenal, not an atom bomb plant — but, in its own way, just as important to the United States.

The "protected place" is a large rubber plantation in Malaya. Today, the freedom-loving people of Malaya are waging a bitter shooting war with hit-and-run Communist bandits who are bent on disrupting the country's vital natural rubber production.

Malaya supplies nearly half of the world's natural rubber. The lack of such rubber would affect the security of all the free nations.

In spite of the severe handicaps of trying to fight a jungle-hidden enemy, Malaya has succeeded in stemming the Communist tide. Malayan rubber production has been maintained. The rubber planter continues to work his rubber land, though it means risking his life every hour of the day and night.

In their fight against the Communists in Malaya, the people of this important Southeast Asian country are maintaining an outpost of freedom and democracy in the very shadow of the Iron Curtain.

Natural Rubber Bureau

1631 K Street, N.W., Washington 6, D.C.

Write for Free Booklet "NATURAL RUBBER AND YOU"

Highlights in the history of Rubber Processing

1906 First organic accelerator

1924 First U. S. patent on the use of age resistors

1925 Mercaptobenzothiazole (MBT)

1935 First catalytic plasticizer

1946 Calco developed the first commercial catalytic plasticizer free from toxic effects and objectionable odor: PEPTON® 22 Plasticizer

1947 Reinforcing furnace blacks became commercially available

1950 ANTIOXIDANT 2246* — the most active non-staining, non-discoloring antioxidant ever developed. A product of Calco

1951 ANOTHER STEP FORWARD ... Calco introduces an important new product to the Rubber Industry ...

NOBS No. 1, the outstanding delayed-action accelerator for natural, synthetic and reclaimed rubber. It is ideal for use with reinforcing furnace blacks in up-to-date tire-compounding. No special handling is required.

Calco®

*Trade-mark

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION
INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

You can get tack with Purecal in GR-S

It's a fact. Purecal* T imparts tack to GR-S — sufficient tack to hold plies together during building operations. In most cases, cementing operations can be eliminated and much of the automatic building equipment used with natural rubber can be used with GR-S.

Purecal T is easier to process in GR-S than in natural rubber. It mixes easier and faster. Because of its ultra-fine qualities, it produces tack and promotes high quality in non-black stocks. Using Purecal T, you can get excellent results at low cost in passenger tire carcasses, hose and belting products, footwear and gum stripping.

We know this — not just from laboratory tests — but mainly from work in plants. We've recorded the findings in a new booklet: "Purecal in GR-S." It contains practical information on the compounding and processing of Purecals in GR-S and cold rubber. We think you'll find it useful — we'll be glad to send it to you.

**Trademark*

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte CHEMICALS
REG. U. S. PAT. OFF.
Offices in Principal Cities
WYANDOTTE, MICHIGAN

Uniform Results—you'll get them with Pittsburgh PX Plasticizers, too!

You're always sure of the "pedigree" of Pittsburgh PX Plasticizers. For, as a basic and integrated producer of vital coal chemicals such as phthalic anhydride, benzene and xylene, we have the important advantage of controlling and maintaining the high *quality* and *uniformity* of our plasticizers from coal to finished products. And that advantage benefits you in three important ways: in dependable, continuing supplies . . . in better performance and ease of use in your formulations . . . and in finished products that are more durable and useful.

Today, you'll find more and more coal chemical products of the Pittsburgh Coke & Chemical Company at work in both peacetime and military production . . . products that are recognized above all else for their *dependability.*

PX-104 ____ DiButyl Phthalate
PX-108 ____ DiIsoOctyl Phthalate
PX-138 ____ DiOctyl Phthalate
PX-208 ____ DiIsoOctyl Adipate
PX-404 ____ DiButyl Sebacate
PX-408 ____ DiIsoOctyl Sebacate
PX-658 ____ TetraHydroFurfuryl Oleate
PX-917 ____ TriCresyl Phosphate

WAD 3031

PLASTICIZER DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Consider the SPEED

Camachine 26-3A operates smoothly at speeds up to 400 fpm depending upon characteristics of the material, number of cuts, web tension, and machine width.

Consider the ROLL QUALITY

Differential rewind assures uniformly wound rolls regardless of minor variations in caliper across the width of the web.

Consider the ECONOMY

Long years of trouble-free service are attested by the records. For example, a manufacturer of mica products reports 26 years of continuous satisfactory performance.

MODEL 26-3A slitter for coated or tacky materials

Speeds up to 400 fpm. Strips widths to 1" with Pneucut slitters, ½" with Integral type slitters, or ¼" with Special slitter units.

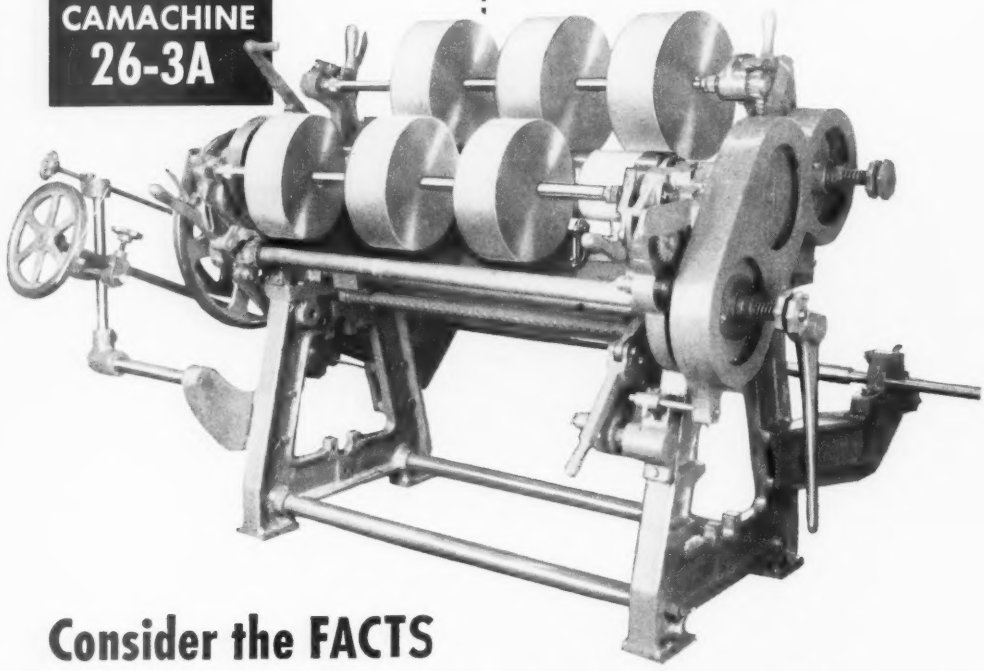
You are invited to consult with Camachine engineers regarding your roll production requirements. For complete information on Camachine 26-3A send for Bulletin 1010.

CAMERON MACHINE COMPANY
61 Poplar Street, Brooklyn 2, N. Y.

Consider the VERSATILITY

Camachine 26-3A handles many different types of plain and coated materials of varying caliper, including .002 acetate film and .020 insulating papers.

CAMACHINE 26-3A



Consider the FACTS

and you'll wind up with Camachines®

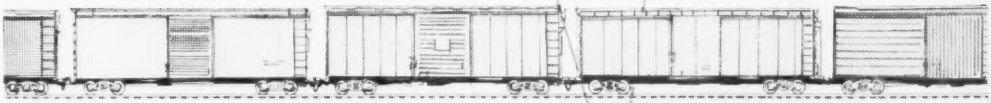
AA-247

more SILENE EF & HI-SIL are on the way!

Columbia-Southern is spending several million dollars on a new plant and research facilities in Barberton, Ohio, to expand its production of Silene EF and Hi-Sil.

This expansion assures a greater supply of these two important pigments for customers and potential users. As the production capacity of this plant moves into high gear, you can rely on Columbia-Southern to better service your needs for Silene EF and Hi-Sil.

In the meantime, it is suggested that you plan now to use these extraordinary pigments in your rubber compounding . . . to take advantage of the new supplies as they become increasingly available.



Both SILENE EF® and HI-SIL® are exclusive non-black rubber reinforcing pigments developed by Columbia-Southern.

SILENE EF—Precipitated hydrated calcium silicate; particle size .03 micron; 2.10 sp. gr. It has high modulus, good tensile, high tear and abrasion resistance.

HI-SIL—Precipitated hydrated silicon dioxide; particle size .025 micron; 1.95 sp. gr. It has high modulus, tensile and tear and extremely high abrasion resistance.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES:
Fifth Avenue at Bellefield • Pittsburgh 13, Pennsylvania

DISTRICT OFFICES: BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
HOUSTON • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS

Freedom

FROM "STICKY" PRODUCTION PROBLEMS—

with G-E SILICONE MOLD RELEASE AGENT 81161

Rubber molders have seen G-E 81161 on the job—and they've seen impressive results. This remarkable silicone emulsion speeds production . . . gives *even* release that prevents pocketing . . . steps up product quality. G-E 81161 can cut down rejects from 15% to 25%! There are good reasons for all this—these important advantages which G-E 81161 offers you . . .

- **Excellent Mold Coverage**—G-E 81161 gives outstanding performance on intricate molds.
- **Stability at Higher Temperatures**—G-E 81161 remains stable at temperatures up to 150 F.
- **Stability under Mechanical Working**—G-E 81161 won't break or cream under *repeated* recycling in centrifugal pumping systems.
- **Hard Water Stability**—G-E 81161 remains stable 24 hours at ½% dilution in water of over 200 P.P.M. hardness.
- **Many Other Advantages**—G-E 81161 will not stain light-colored stocks, is rust-inhibited, has low toxicity, and gives outstanding performance in numerous other ways.

Laboratory tests and practical use by many of the largest rubber companies have proved these advantages for G-E 81161. We suggest you try it yourself. *Chemical Department, General Electric Company, Pittsfield, Massachusetts.*

For details, write to Section P-3, General Electric Company, Waterford, New York. (In Canada: Canadian General Electric Co., Ltd., Toronto.)

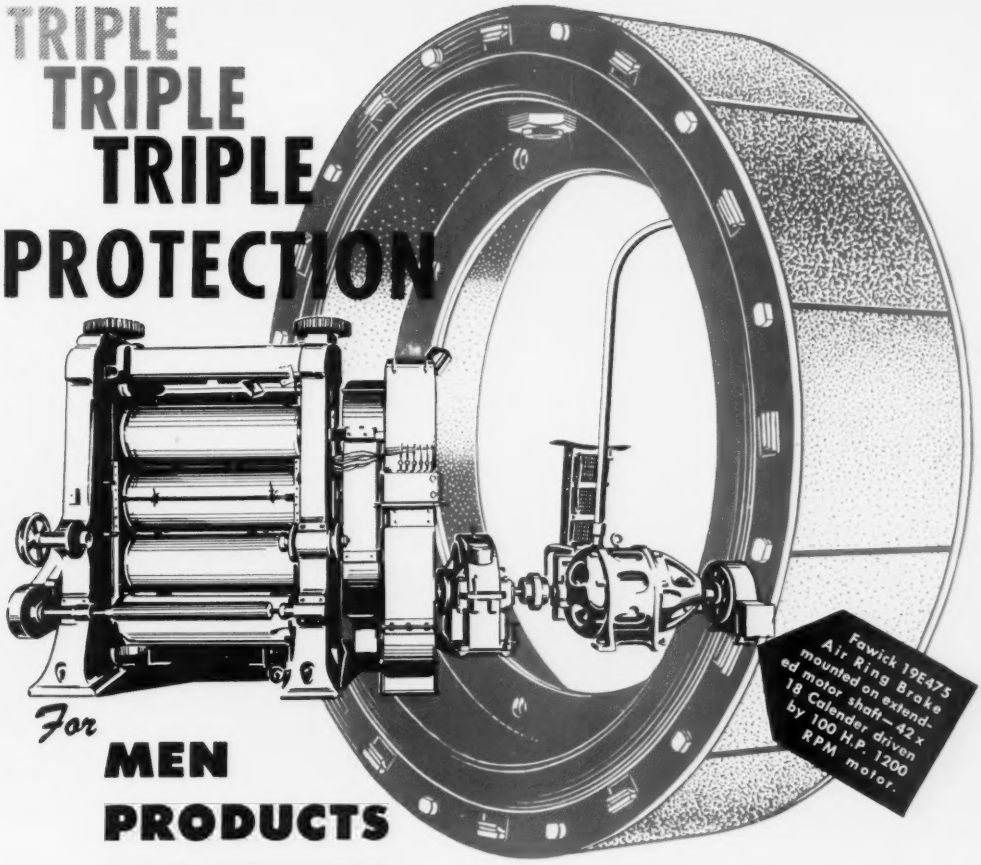
Smoother finished rubber buttons are obtained through the even release provided by G-E 81161.

Tires are easily released untorn, unscratched—thanks to G-E 81161, which prevents pocketing.

Silicones for the Rubber Industry

GENERAL ELECTRIC

TRIPLE TRIPLE TRIPLE PROTECTION



For

MEN
PRODUCTS
MACHINES

The positive and efficient operation of Fawick Clutch and Brake units insures protection for men, products, and machines.

One, they protect workers by giving them sensitive and complete control of machine operation.

Two, they insure top-quality processing of material by their quick response and full effect in operation.

Three, they add years of top-efficiency operation by eliminating the damaging effects of inferior clutch or brake action.

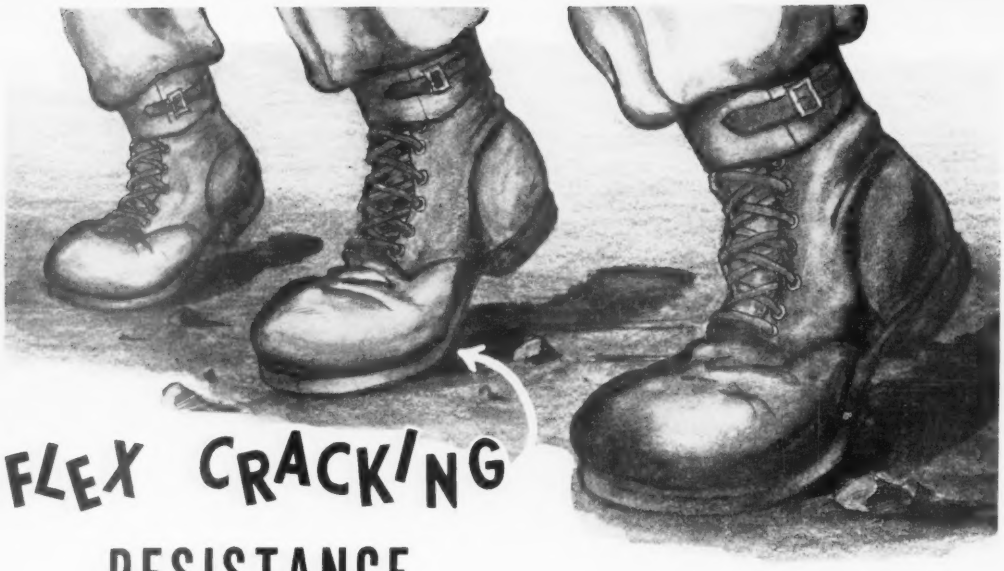
Fawick design and operating features provide (1) even-pressure "constant velocity" contact on the full width of the friction surface; (2) rugged construction for heavy-duty applications; (3) complete range of torque control; (4) instant-acting remote control.

For further information on Fawick Industrial Clutch and Brake Units, write to the Main Office, Cleveland, Ohio, for Bulletin ML-22.

FAWICK AIRFLEX COMPANY, INC.
9919 CLINTON ROAD • CLEVELAND 11, OHIO

FAWICK *Airflex*

INDUSTRIAL CLUTCHES AND BRAKES



FLEX CRACKING RESISTANCE for ARMY COMBAT SHOES

PEQUANOC RECLAIMED RUBBER No. 2500

Test data indicate this compound to be well within the quartermasters' specifications for soles of Army combat shoes.

Write for samples of Pequanoc reclaim to meet your particular requirements.

ARMY COMBAT SOLE-MILS 10047

GR-S	32.5
2500 Reclaim	22.0
Carbonex S	4.0
Staybelite Resin	2.0
Zinc Oxide	1.7
Paraffin Wax	.6
Mineral Oil	1.7
M.P.C. Carbon Black	32.0
Stearic Acid	.8
MBTS	.8
DOTG	.3
Anti Flex Cracking Antioxidant	5
Sulfur	1.0
	100.0
Shore A Hardness	80.0
Bureau of Standards Abrasive Index	62.0
Ross Flexing after 24 hrs. aging at 212 F. (25,000 cycles)	.80 Max
Cure 8 mins. at 320 F. Approximate lb. cost	$0.165
Specific Gravity	1.23
Approximate volume cost	$0.203

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER

MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

pound for pound...

CRYSTEX INSOLUBLE SULPHUR IS YOUR BEST BET!

Pound for pound, on a per unit basis, you'll find that CRYSTEX contains more insoluble sulphur, for CRYSTEX is guaranteed to be 85% insoluble in Carbon Bisulphide. Before you order insoluble sulphur, first check the prices, but it's just as important to check the percentage of insoluble sulphur. By this per unit comparison, CRYSTEX insoluble sulphur is more economical and many users find that its use gives them a better product.

Let us send you a generous testing sample and the very latest technical and use data for CRYSTEX Insoluble Sulphur.

Other Stauffer Rubbermakers' Chemicals

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure

Refined Rubbermakers' Sulphur, Tube Brand

"Conditioned" Rubbermakers' Sulphur

Flowers of Sulphur, 99½% Pure (30% Insoluble in CS_2)

Carbon Tetrachloride

Carbon Bisulphide

Caustic Soda

Sulphur Chloride

Borax

Boric Acid

Stauffer CHEMICALS SINCE 1885

STAUFFER CHEMICAL COMPANY

420 Lexington Avenue, New York 17, N. Y.

221 North LaSalle Street, Chicago 1, Ill. • 824 Wilshire Boulevard, Los Angeles 14, Cal.
636 California St., San Francisco 8, Cal. • 424 Ohio Bldg., Akron 8, O.
Apopka, Fla. • N. Portland, Ore. • Houston 2, Tex. • Weslaco, Tex.

applications of

VELSICOL RESINS

FOR RUBBER COMPOUNDING

GE-9—AB11-4—AB11-2

some suggested applications:

MECHANICAL GOODS
ELECTRICAL INSULATION COMPOUNDS
RUBBER SHOE SOLES AND HEELS
RUBBER FLOOR TILING
GASKETS AND JAR RINGS
RUBBER ADHESIVES AND CEMENTS
MOLDED RUBBER PRODUCTS
TUBULAR COMPOUNDS
RECLAIMED RUBBER
SHEETING
COLORED RUBBER STOCKS
BATTERY CASES
HARD RUBBER COMPOUNDS

features:

1. THERMOPLASTIC HYDROCARBON RESINS.
2. COMPATIBLE WITH NATURAL AND SYNTHETIC RUBBERS.
3. EFFECTIVE PLASTICIZERS AND SOFTENERS... in highly-loaded clay stocks or in recipes incorporating carbon black.
4. MILL READILY.
5. EXCELLENT DISPERSING AGENTS FOR FILLERS AND PIGMENTS.
6. FACILITATE PROCESSING PROCEDURES . . . impart excellent milling, calendering processing and tubing characteristics to stocks.
7. IMPART EXCELLENT PERFORMANCE CHARACTERISTICS . . . such as good tensile strength, elongation and modulus, as well as good resistance to abrasion and aging.
8. POSSESS HIGH ELECTRICAL RESISTANCE PROPERTIES.
9. AID IN THE DEVELOPMENT OF NON-SCORCHY STOCKS... without excessive retardation of cure at high temperatures.

For additional information concerning properties and applications of Velsicol Resins, write:

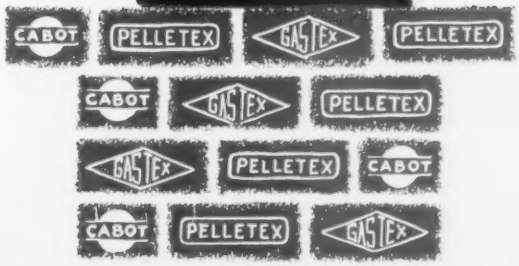
VELSICOL CORPORATION

GENERAL OFFICES AND LABORATORIES
330 E. GRAND AVE.
CHICAGO 11, ILL.

offices in principal cities

EXPORT DIVISION
100 EAST 42nd ST.
NEW YORK, N. Y.

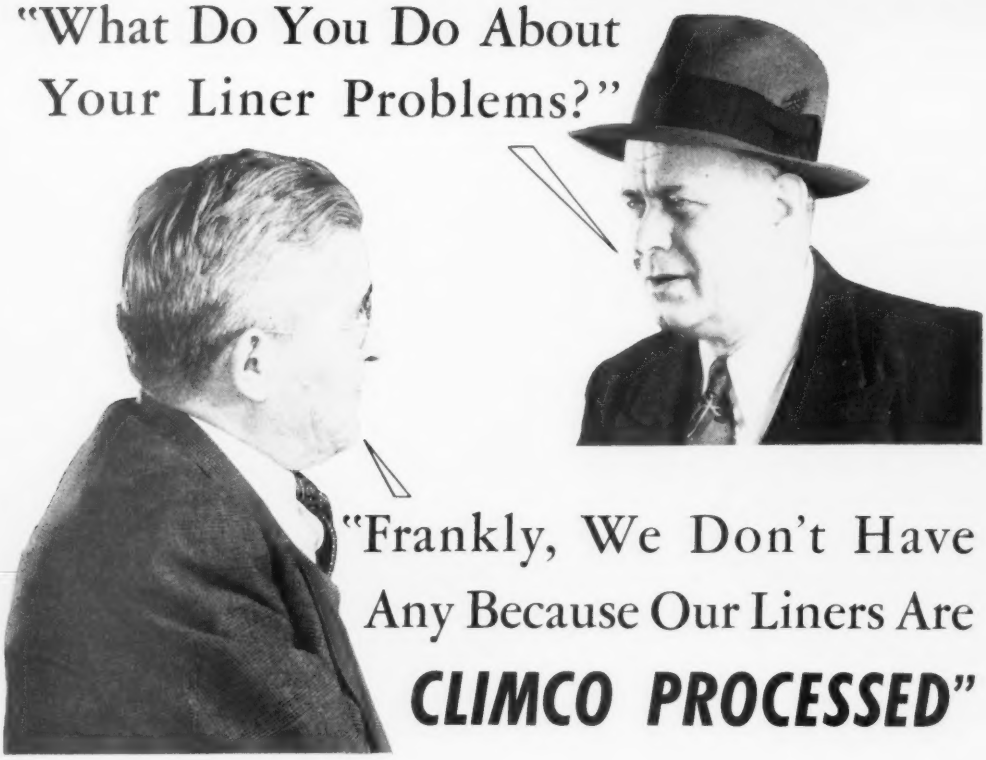
Season's Greetings



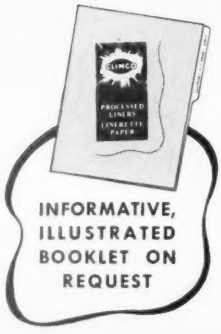
The GENERAL ATLAS Carbon Co.

77 FRANKLIN STREET, BOSTON 10, MASS.

"What Do You Do About Your Liner Problems?"



"Frankly, We Don't Have Any Because Our Liners Are CLIMCO PROCESSED"



INFORMATIVE, ILLUSTRATED BOOKLET ON REQUEST

By insuring perfect separation of stock and liner, Climco Processing eliminates all the costly production problems resulting from stock adhesions.

Here are some additional advantages of Climco Processing: Liner life is greatly increased, tackiness of the stock is preserved, and gauges are more easily maintained. Latitude in compounding is enlarged, lint and ravelings are eliminated, and horizontal storage is facilitated.

For twenty-five years Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

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5508 Maurice Avenue • Cleveland 4, Ohio, U. S. A.
Cable Address: "BLUELINER"

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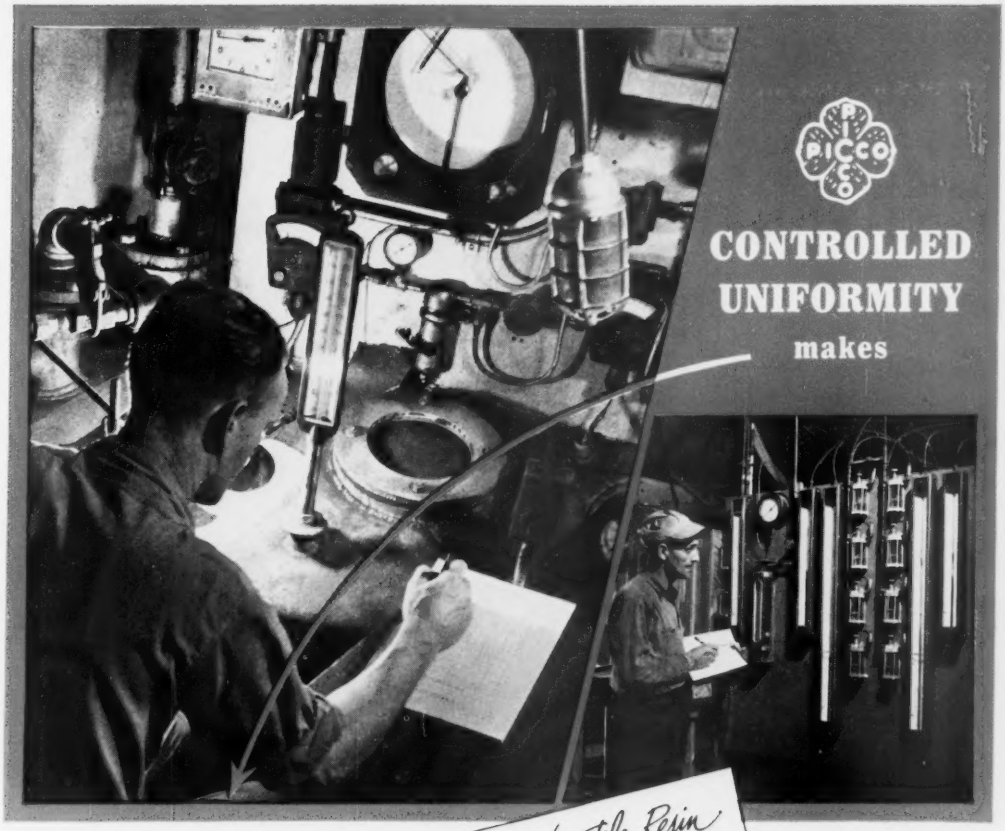
LINERETTE INTERLEAVING PAPER
Treatment Contains NO OIL OR WAX
Samples on Request

CLIMCO
PROCESSED LINERS
Serving the Rubber Industry for 25 Years



The Versatile Resin

PICCOLYTE dependable

You are assured of dependable uniformity when you use PICCOLYTE, because of the rigid control of every step of manufacture. The photograph above shows the controls of the Polymerizer, the kettle in which resin is made from Pinene.

Manufacturing equipment is of the most modern design, and highly perfected instrumentation procedure permits operators to keep the material under constant observation during processing.

PICCOLYTE is a versatile resin, having properties that make it ideally suited for a wide variety of products.

Write for bulletin giving complete details.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
Clairton, Pennsylvania
... Plants at Clairton, Pa., West Elizabeth, Pa.; and Chester, Pa.

Distributed by Harwick Standard Chemical Co., Akron 5, Ohio

A Dramatic Example of BARRETT'S EXPANSION

As defense production has been stepped up, the demand for Barrett* chemicals has grown tremendously.

Among the Barrett products eagerly sought is phthalic anhydride, vital to the production of alkyd resins, phthalate ester plasticizers, and many other important materials.

To meet this great demand, Barrett has taken two decisive steps that will substantially raise the output of phthalic anhydride.

First, the capacities of Barrett's Philadelphia and Ironton plants already have been increased. Second, Barrett is well under way in its plans to build two new plants in Chicago and Philadelphia. The one in Philadelphia alone will increase the production of phthalic anhydride by 36,000,000 pounds each year!

For defense and for civilian production . . . Barrett is expanding to help keep America strong!

* Reg. U. S. Pat. Off.

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

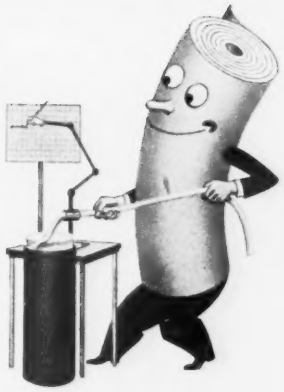
LEADING MANUFACTURERS COUNT ON BARRETT AS THE LARGEST PRODUCER OF PHTHALIC ANHYDRIDE

UNIFORMITY

Makes the Big Difference

in INDUSTRIAL

Fabrics



MT. VERNON FABRICS

Give You Greater Fabric Uniformity

The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products—smoother, more efficient fabrication.

AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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CHECKING EVENNESS OF SLIVER WITH LINEAR REGULARITY TESTER. One of a series of laboratory controls throughout production to assure fabric uniformity in all Mt-Vernon-Woodberry products.

You can't meet competition or stop Stalin by pitching raw materials and manpower into the scrap bin.

And if you don't know how to eliminate scrap ask Moe Muscles or any other pressman who has worked with our silicone release agents.

They'll tell you how much easier it is to unload deep cavity molds and complicated shapes. That eliminates torn heats. And because only a very light application is required to give easy release, you can check off non-knits, fold-overs and loose tuck-unders too.

They'll tell you how much our silicone lubricants improve flow—even in heavily loaded stocks. That puts an end to non-fill rejects.

By keeping molds cleaner longer, our silicone release agents also help to maintain close tolerances; keep white and light colored stocks clean; assure uniformly high surface finish and sharp detail.

Dow Corning Silicones Mean Business!

For more information call our nearest branch offices or write for data sheet M-12

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

For Easier Release and Better Quality
SPECIFY
DOW CORNING SILICONE MOLD RELEASE AGENTS
EMULSIONS for molds and curing bags; MOLD RELEASE FLUID in solvent solution for green carcass, bead and parting line release.

FIRST IN SILICONES
DOW CORNING CORPORATION

ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES • NEW YORK • WASHINGTON, D. C.
IN CANADA: FIBERGLAS CANADA LTD., TORONTO • GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON

FARREL-BIRMINGHAM EXTRUDERS

for specialized production

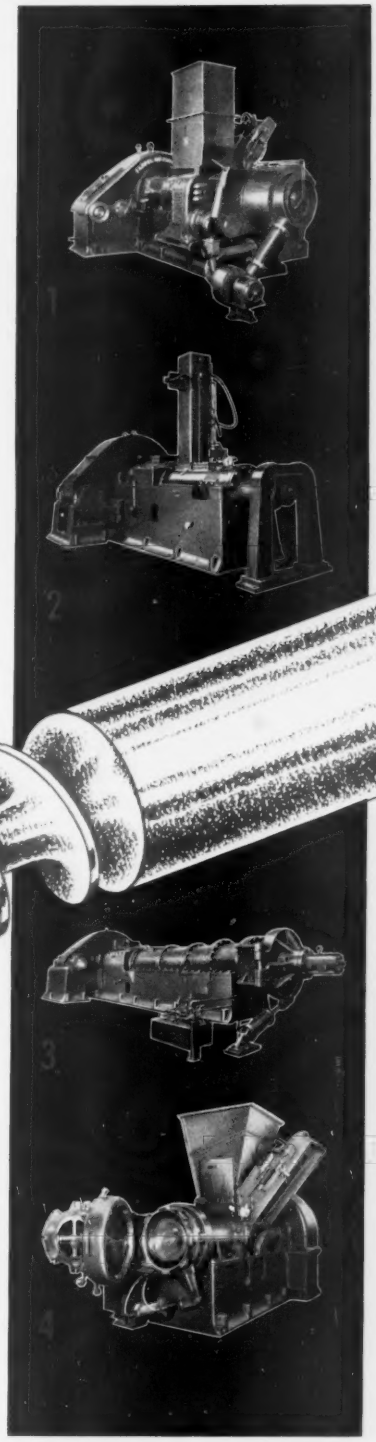
Farrel-Birmingham Extruders are designed to meet individual requirements for special extruding jobs. Take these four machines, for example.

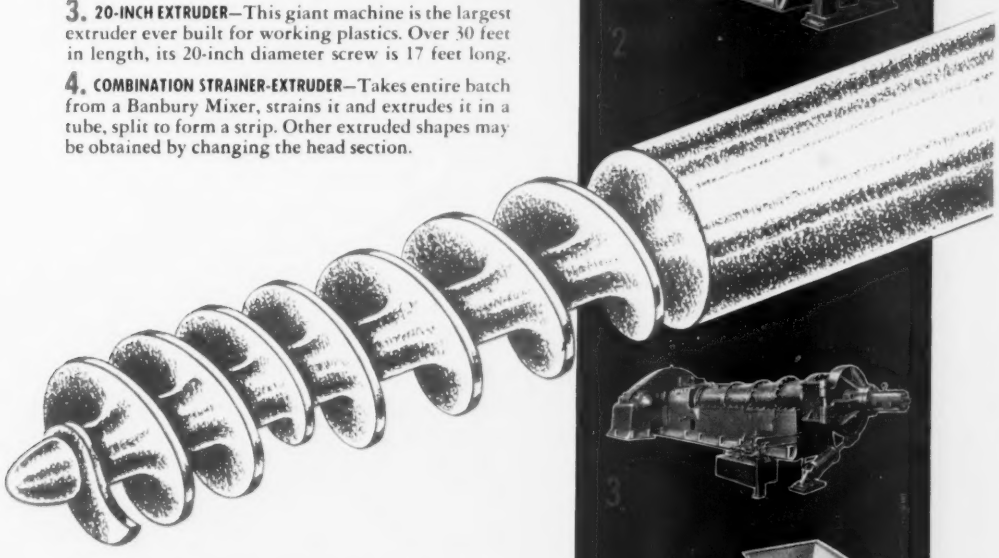
1. HALE PELLETIZER—Produces free-flowing rubber pellets which provide more efficient and economical handling and storage, quicker processing and more uniform quality.

2. GORDON PLASTICATOR—Specially designed for breaking down rubber. Improved plasticity and high productive capacity at low cost characterize its performance.

3. 20-INCH EXTRUDER—This giant machine is the largest extruder ever built for working plastics. Over 30 feet in length, its 20-inch diameter screw is 17 feet long.

4. COMBINATION STRAINER-EXTRUDER—Takes entire batch from a Banbury Mixer, strains it and extrudes it in a tube, split to form a strip. Other extruded shapes may be obtained by changing the head section.





If you have an extrusion problem, why not call in a Farrel-Birmingham engineer for consultation?

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham®

FB-652

Give your VINYL PLASTICS the VALUABLE PROTECTION of "Dutch Boy" Stabilizers

Choose these for the best electrical insulation compounds

"DUTCH BOY" TRIBASE

Tri-basic Lead Sulphate. Tribase is the most basic lead sulphate available. It has a total lead content equivalent to 90% PbO, which means it affords maximum reactivity with the degradation products of vinyls caused by heat.

It is the quality stabilizer for vinyl insulation. The electrical characteristics and heat stability of vinyl compounds containing Tribase are unsurpassed!

"DUTCH BOY" TRIBASE-E

Basic Lead Silicate Sulphate. Tribase-E was specifically developed to answer the vinyl electrical insulation industry's demand for a stabilizer with exceptional heat stability and good electrical characteristics at low volume cost.

Tribase-E takes advantage of the electrical properties of lead silicates without sacrificing moisture repellency. The safe reactive lead content, together with the absence of any carbonate, eliminates danger of gassing.

"DUTCH BOY" DS-207

Di-basic Lead Stearate. When used with Tribase or Tribase-E, DS-207 improves processing characteristics, water repellent properties and light stability of your vinyl insulation stocks. DS-207 has a double utility when used in Vinyl Plastics. It is an excellent heat and light stabilizer; it is an effective lubricant.

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability

"Dutch Boy" Stabilizers—Tribase, Tribase-E, DS-207—impart excellent electrical properties, improved resistance to moisture, increased stability to heat and light aging.

They have maximum reactive lead content; they are widely compatible with other compound ingredients; they're economical.

And—like all "Dutch Boy" products—they're backed up by the solid reputation of the maker—National Lead Company.

Our technical staff will be glad to help you stabilize vinyl resins for any use. Write for complete information.

Dutch Boy* **CHEMICALS**

*Reg. U. S. Pat. Off.

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111 Broadway New York 6, N.Y.

SHELL DUTREX 6

- Plasticizer and Extender for GR-S Tire Treads, Footwear and Mechanical Goods
- Chemically and Physically Controlled

SHELL OIL COMPANY

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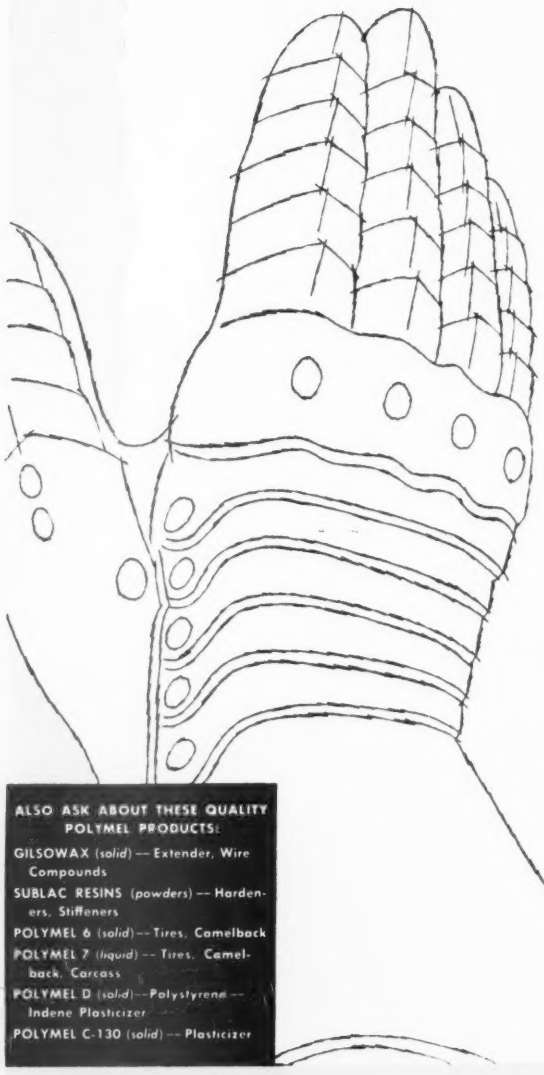
a challenge

to compounders of natural or synthetic rubber!



Try a free production sample of d-TAC, the new, non-coloring, powdered resin that reduces tackiness and milling time. Prove to yourself that d-TAC actually eliminates the problem of sticking to mill rolls!

Here are three reasons why leading rubber producers are turning to sensational new d-TAC to reduce costly tackiness in natural and synthetic rubbers!

1. VERSATILE—performs equally well in highly loaded natural or synthetic rubber batches. d-TAC has no effect on the cure or physical properties.

2. EFFICIENT—even in small quantities. You use only 1 to 6 parts of d-TAC on the rubber, depending upon the degree of tack to be reduced.

3. ECONOMICAL—d-TAC costs but 22c per pound, f.o.b. plant in l.c.l. quantities.

WRITE TODAY for your free sample of d-TAC and see for yourself how quickly you can put an end to milling problems, thus increasing the capacity of your mills.

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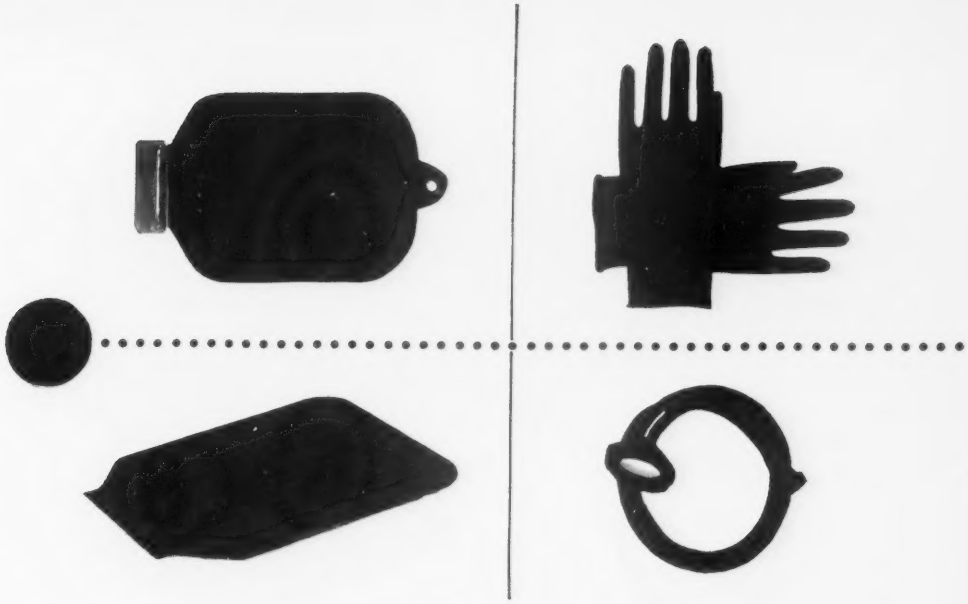

for economical color strength

BARIUM RED LAKE C TONERS

Red Lake C Toner XL 20-5100

Red Lake C Toner L 20-5200

Red Lake C Toner M 20-5650

For bright, clean yellowish reds in druggists' rubber sundries, toys and miscellaneous novelties, specify BARIUM RED LAKE C Toners.

RED LAKE C Toners are non-migrating, non-subliming and very low in solvent and oil bleed. They are economical high strength reds, with sufficient light fastness for a great variety of products which require brilliant, clean colors for maximum decorative value.

Consult your Calco representative for full information about these and other pigments for rubber in the *complete* Calco line.

Calco®

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION
PIGMENT DEPARTMENT
BOUND BROOK, NEW JERSEY

Branches and Warehouses in Principal Cities

BALANCED PERFORMANCE

Marbon "8000"

Look what Marbon "8000" can do for your rubber compounds

- *Higher hardness without brittleness*
- *Improved flex crack growth resistance*
- *Better abrasion resistance*
- *Improved weather and heat resistance*
- *Unlimited color possibilities (non-staining)*

Marbon

MARBON CORP.

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SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

GODFREY L. **CABOT**, INC., Boston

Everyone at

The **C. P. Hall** *Co.*

Chemical Manufacturers

Wishes you

Merriment

at Christmas-Time, and

Prosperity

throughout the

New Year

Established 1919

AKRON, OHIO

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ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

SPECIAL ZINC OXIDE SPEEDS INCORPORATION OF CARBON BLACK

Protox-166, the specially-treated zinc oxide, materially reduces the incorporation time of blacks in tread stocks–thus expanding mixing capacity and lowering operating costs.

This advantage of Protox-166 over untreated zinc oxide, in activating amounts, was reported to us by a prominent tire manufacturer.

On a laboratory mill we have substantiated those findings on both channel and furnace blacks *(see table)*.

This advantage of Protox-166 stems from its unique coating of zinc propionate, which provides an inherent plasticizing effect and improved dispersion.

INCORPORATION TIME OF BLACKS IN TREAD STOCKS

	EPC Black in GR-S	*Furnace Black in "Cold Rubber"*
Untreated Zinc Oxide	14 min.	15 min.
Protox-166 Zinc Oxide	9.5 min.	14 min.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

for Rubber **COMPOUNDING •**

1. Compatible with Buna N and GR-S types of rubber
2. Can also be used advantageously with Natural Rubber and Neoprene
3. Improves processing and molding
4. Improves the following:
   - Hardness
   - Chemical Resistance
   - Toughness
   - Abrasion
   - Heat Resistance
   - Mechanical Properties

Synvarite RC Resins

ALSO

1. SYNVARITE RC Resins and Solutions for Rubber Cements and Adhesives.
   - Excellent Solvent Release
2. SYNVARON TN 23 for detackifying and reinforcing of Natural and Synthetic latex.
3. SYNVAREN Liquid resins for cements and adhesives.

MANUFACTURING PHENOLIC, UREA AND RESORCINOL RESINS FOR ALL INDUSTRIES SINCE 1939

SYNVAR RESINS

SYNVAR CORPORATION
Wilmington 99, Delaware

Rubber Equipment Specialists

A-C SUPPLY CO.

SUPPLIERS WHO KNOW THE REQUIREMENTS OF THE RUBBER INDUSTRY

Electrical equipment for:

CALENDERS • EXTRUDERS • MILLS • BANBURYS • CONVEYORS

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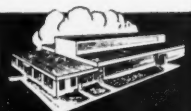
Experienced in Engineering Special Drives and Controls

SERVICE · QUALITY · DEPENDABILITY

ALL EQUIPMENT—NEW or USED
FULLY GUARANTEED

THE A-C SUPPLY COMPANY



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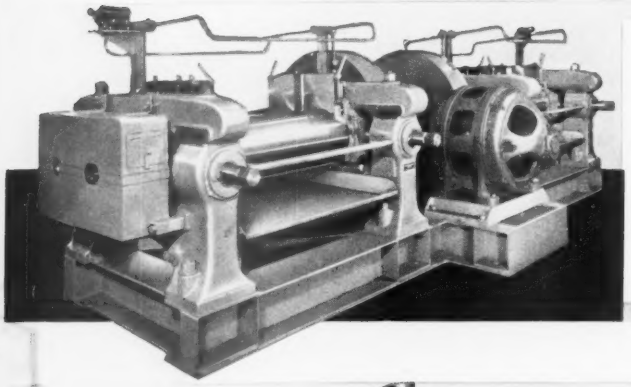
from Witco's eight plants, season's greetings and best wishes for the new year

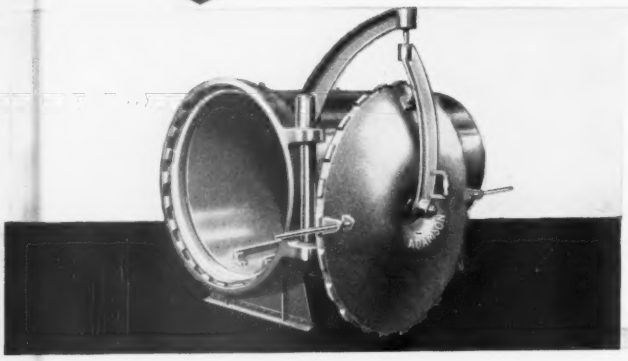
ADAMSON UNITED COMPANY
AKRON 4, OHIO

Plastics and



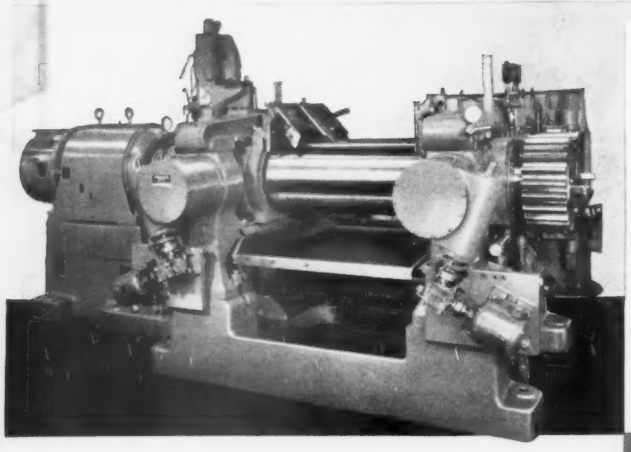
TWIN MILL UNIT

22" & 22" x 60" Mills designed and built for mixing and plasticizing an internationally known plastic material. The rolls operate in anti-friction bearings and the two Mills, together with right angle drive and motor, located between the units, are mounted on a continuous one-piece bedplate.



VULCANIZERS or AUTOCLAVES

Built in sizes ranging from 18 inches to 15 feet in diameter and any length, vertical or horizontal. Illustration shows a horizontal type with hinged, quick-opening door. Vulcanizers can be built to withstand internal pressures up to 1000 pounds per square inch. Write for our special bulletin .



MIXING MILLS

These are built in all sizes from 6" x 16" to 28" x 84". The one illustrated is a late model (shown without gear enclosure), designed for plastics. It has rolls 20" in diameter by 48" long on the working face; flood lubricated roll boxes; tilting stock guides; motor-operated adjusting screws; stainless steel stock pan; dial indicators for front roll position; two sets of connecting gears for operating rolls at two different friction ratios, and an individual motor drive, with geared head and flexible coupling direct-connected to rear roll.

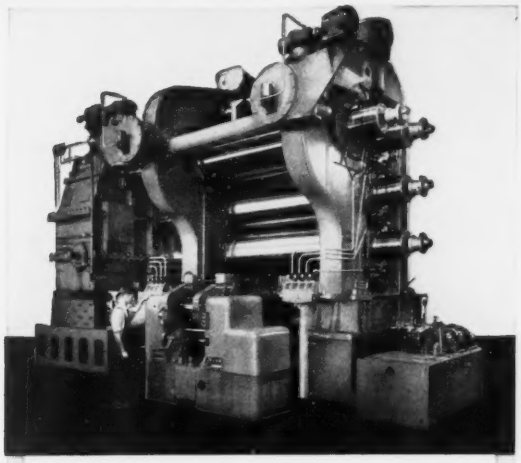
We can supply any size Mill driven individually; in pairs with right angle reducer between the units; or grouped on a line shaft with reducer at one end of the shaft.

Write for our new catalog covering Mills, Refiners, Crackers and Washers.

Designers and Builders of Basic Machinery for the Rubber, Plastics and Plywood Industries

Branch Offices Located in Principal Cities

Rubber Processing Machinery



CALENDERS

The large Calender has four rolls measuring 36" in diameter by 92" long on their working faces. They are mounted in anti-friction bearings which are preset for precision operation at high temperature. Each roll is individually-driven from a separate gear stand. All bearings are flood lubricated from a central supply. The off-set, top and bottom rolls have individual motorized adjustment through double Cone worm reducers.

The small Calender in the foreground has four rolls measuring 8" in diameter by 16" long on their working faces. These rolls also operate in selected anti-friction bearings which are flood lubricated.

Each Calender is provided with motor and electric controls installed on flush mounted panels.

In addition to designing and building Calenders, we can supply all the processing equipment necessary for a complete operation. This includes plastic sheeting and the coating of fabrics with plastic or rubber compounds.

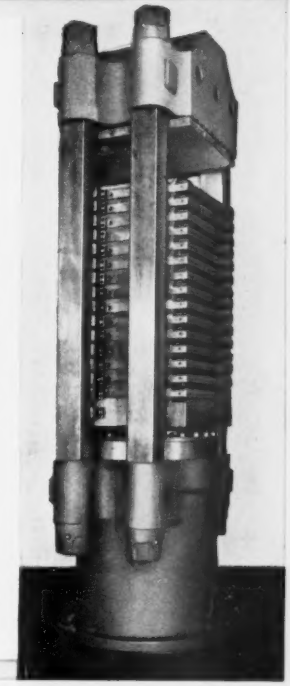
Write for our new calender catalog.

MULTIPLE DECK PRESSES

Multiple deck press with fifteen openings. This Press was constructed for extremely high pressures per square inch on the platens. We have standard designs for square platen presses in sizes varying from 12" x 12" to 60" x 60", and for Presses with oblong platens ranging from 12" x 14" to 70" x 84". Patterns and drawings are available for almost any size within the above two ranges but we are prepared to design and construct much larger ones.

These Presses can be built self-contained or for connection to existing hydraulic supply.

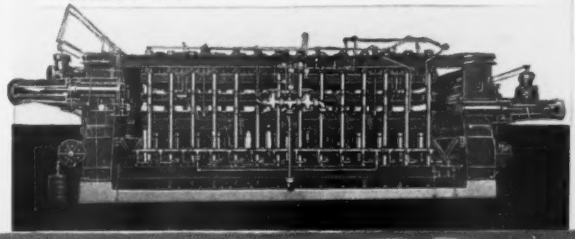
Write for our new catalog covering our full line of Hydraulic Presses.



BELT PRESSES

Belt Press with two openings. Platens are 63" wide by 31' long. This Press weighs over 300 tons and will deliver 250 lbs. per square inch on the platens. It comes complete with stretchers and clamps, the latter mechanically controlled directly from the movement of the platens. Standard designs for various sizes are available.

In addition to the above we also make a full line of open side Presses equipped with stretchers and clamps to cure endless V-belts.



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- Mills
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- Crackers
- Washers
- Rubber Sheeting & Coating Calenders
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- Calender Wind-ups
- Calender Cooling Rolls
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- Embossing Calenders
- Pot Heaters
- Vulcanizers
- Autoclaves
- Rotocure Machines
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment

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Technical Control of Clay Production

Suprex Clay is a unique, low-cost reinforcing pigment of a rare type found only in a small area in South Carolina—and nowhere else in the world. Its fine inherent quality is safeguarded by scientific mining and refining methods under rigid technical control—from crude clay to finished product.

Every 30 minutes a production sample is tested for moisture and screen residue and examined closely for color. Frequent composites are rechecked by these tests and actually compounded into rubber—the final safeguard of end-use uniformity.

No wonder that Suprex is the standard of comparison!

Basic Factors in Huber Clay Production

1. Scientific Mining
2. Modern Refining Equipment
3. Technical Control
4. Experienced Supervision
5. Careful Packaging and Shipping

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J. M. HUBER CORPORATION, 100 Park Avenue, New York 17, N. Y.
ONE OF THE WORLD'S LARGEST CLAY PRODUCERS
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VOLUME 70
NUMBER 3

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By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
(Out of Print)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

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RUBBER AGE

Vol. 70. No. 3 DECEMBER, 1951

Zinc Oxide in Latex

1 - Preparation of Aqueous Suspensions for Addition to Latex Compounds

By H. C. JONES and C. A. KLAMAN

Research Department, The New Jersey Zinc Co. (of Penna.), Palmerton, Penna.

LATEX consumption in the United States in the past twenty years has shown a spectacular growth. The consumption increased from less than 5000 tons based on the dry solids content in 1930 to 25,000 to 30,000 tons in 1940. In 1950 the total consumption of natural and synthetic rubber latex was 82,000 tons, which represented a 25 per cent increase over 1949. Although the increment was chiefly natural rubber latex, during the past year some branches of the industry have been successfully replacing considerable amounts of the natural product with cold rubber latex in the period of critically short supply. As natural and synthetic rubber latices assume greater importance, the need for technical information on this subject becomes more urgent.

The compounding of zinc oxide in latex may be resolved into two general types of problems. The first deals with the preparation of suitable aqueous suspensions of the pigment for subsequent addition to the latex composition. Technical data and a detailed discussion of this subject are included in this report. The second consideration relates to latex stability since this property is markedly influenced by zinc oxide, and the presence of adequate amounts of the proper protective colloids is essential for a latex composition that will not precoagulate in processing or during short storage intervals. A future report will cover a discussion of the effect of zinc oxide on latex stability.

The purpose of zinc oxide in a latex compound is the same as that in a dry rubber mix, namely, that of serving as the accelerator activator and, together with the sulfur and accelerator, providing a strong, well vulcanized rubber. Zinc oxide also functions as part of the gelling and heat sensitization system in latex foam sponge and other latex applications where these factors are involved.

The conventional practice is to premix zinc oxide and other dry ingredients in aqueous suspensions with the aid of suitable wetting agents and protective colloids in a pebble or colloid mill. The solid ingredients can then be introduced into the latex with a minimum of agitation. The preliminary step of making the master suspensions of the dry ingredients is important in that it insures effective and complete dispersions of the powder in the latex, provided the solids are initially well dispersed in the master solutions. Adding the dry ingredients directly to the latex would be unsatisfactory in that it might precoagulate the latex and, if not, would certainly yield an inferior dispersion of the solids in the latex film.

A close control of both viscosity and settling characteristics of the solids is imperative, particularly in the large scale handling of suspensions in pipelines and pumps as, for example, in the latex foam sponge industry.

At this point it would be advisable to explain the relationship between dispersion and settling of the solids content and the viscosity of a suspension. It should be borne in mind that the concentration of pigment used in these experiments is high and that the forces of

TABLE I—VISCOSITY AND SETTLING TESTS ON ZINC OXIDE SLURRIES WITH 4 PER CENT DARVAN NO. 1

	XX-4	Kadox-15	XX-50	Kadox-72	XX-78	Protox-166
XX-4	550.0	—	—	—	—	—
Kadox-15	—	550.0	—	—	—	—
XX-50	—	—	550.0	—	—	—
Kadox-72	—	—	—	550.0	—	—
XX-78	—	—	—	—	550.0	—
Protox-166	—	—	—	—	—	550.0
Darvan No. 1	22.0	22.0	22.0	22.0	22.0	22.0
Water	803.0	803.0	803.0	803.0	803.0	803.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	22.4	292.1	23.0	23.7	22.3	18.3
1 Day after mixing	23.7	257.5	21.3	23.7	20.7	19.0
2 Days after mixing	23.4	228.4	18.1	24.7	19.6	19.6
3 Days after mixing	22.1	217.9	18.8	24.0	20.7	18.6
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	86.5	99.0	78.0	87.5	84.0	91.0
2 Days after mixing	73.0	96.0	59.5	72.0	69.0	82.0
3 Days after mixing	61.5	94.0	47.0	52.0	57.0	75.0
14 Days after mixing	42.0	91.0	43.0	50.0	33.0	36.0
Slurries ball milled 24 hours—contain 40% zinc oxide plus 4% Darvan No. 1 on pigment content.						
pH of Zinc Oxide Slurries	7.09	8.91	7.11	8.72	8.42	6.93

flocculation have a marked influence on pigment settling and slurry viscosity. When the individual pigment particles or other solids are completely dispersed, the viscosity of the suspension is low, and the pigment particles settle slowly to a dense, closely packed layer. However, if the pigment is in a flocculated state, the slurry has a relatively higher viscosity and the pigment will settle rapidly but to a high volume. To preclude the possibility of the well dispersed pigment settling to a hard cake, the common practice is to mildly agitate the slurry while in storage.

The behavior of pigment in water suspension has a parallel in the work reported by Green *(1)*. He incorporated zinc oxide in kerosene and after some working of the mixture with a spatula a puffy paste was formed. When the consistency was such that the mass was sufficiently puffy to retain its form without flowing, a single drop of blown poppyseed oil was added. The mass immediately lost its form and was sufficiently fluid to pour. Photomicrographs showed that before the addition of the poppyseed oil, the pigment was in a highly flocculated state, while in the second instance, the pigment was completely dispersed.

In selecting a zinc oxide for the latex compound, particle size and curing characteristics of the oxide are the first considerations as they are in the designing of a conventional dry mix rubber compound. The next step is to prepare an aqueous suspension having suitable viscosity, dispersion and non-settling characteristics, and the following experimental data indicate the range in suspension properties for several zinc oxides and a number of typical wetting agents in 40 per cent zinc oxide suspensions.

The pigment suspensions were prepared by (a) ball-milling, (b) motor stirring, and (c) colloid mill mixing, and the type of milling operation and the size of the charge are indicated in each table. A standard quart size pebble mill jar with 1250 grams of pebbles was

TABLE II—VISCOSITY AND SETTLING TESTS ON ZINC OXIDE SLURRIES WITH 2 PER CENT MARASPERSE CB

	XX-4	Kadox-15	XX-50	Kadox-72	XX-78	Protox-166
XX-4	550.0	—	—	—	—	—
Kadox-15	—	550.0	—	—	—	—
XX-50	—	—	550.0	—	—	—
Kadox-72	—	—	—	550.0	—	—
XX-78	—	—	—	—	550.0	—
Protox-166	—	—	—	—	—	550.0
Marasperse CB	11.0	11.0	11.0	11.0	11.0	11.0
Water	814.0	814.0	814.0	814.0	814.0	814.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	18.1	11.9	16.0	12.6	15.9	156.6
1 Day after mixing	17.5	13.0	15.9	12.9	17.8	126.0
2 Days after mixing	15.5	9.1	15.7	16.7	15.9	118.3
3 Days after mixing	16.8	13.0	15.2	14.6	16.2	110.2
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	98.0	99.5	80.0	97.0	84.0	88.0
2 Days after mixing	96.0	99.5	74.0	97.0	79.0	86.0
3 Days after mixing	93.0	98.5	58.0	91.0	66.0	81.5
14 Days after mixing	43.0	86.0	36.5	35.0	30.0	72.0
Slurries motor stirred 5 minutes—contain 40% zinc oxide plus 2% Marasperse CB						
pH of Zinc Oxide Slurries	7.35	8.89	7.32	8.70	8.51	6.58

TABLE III—VISCOSITY AND SETTLING TESTS ON ZINC OXIDE SLURRIES WITH 2 PER CENT TAMOL N

	XX-4	Kadox-15	XX-50	Kadox-72	XX-78	Protox-166
XX-4	550.0	—	—	—	—	—
Kadox-15	—	550.0	—	—	—	—
XX-50	—	—	550.0	—	—	—
Kadox-72	—	—	—	550.0	—	—
XX-78	—	—	—	—	550.0	—
Protox-166	—	—	—	—	—	550.0
Tamol N	11.0	11.0	11.0	11.0	11.0	11.0
Water	814.0	814.0	814.0	814.0	814.0	814.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	15.8	449.6	23.5	14.5	15.9	16.3
1 Day after mixing	17.1	473.0	19.1	15.5	15.9	16.8
2 Days after mixing	18.7	458.4	16.3	13.6	16.8	18.2
3 Days after mixing	16.9	466.6	15.8	17.0	21.2	17.1
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	88.0	98.0	77.0	92.0	82.0	91.0
2 Days after mixing	75.0	96.0	58.0	85.0	67.0	82.0
3 Days after mixing	63.0	94.0	43.0	77.0	53.0	74.0
14 Days after mixing	47.0	83.0	43.0	58.0	33.5	41.0
Slurries motor stirred 5 minutes—contain 40% zinc oxide plus 2% Tamol N						
pH of Zinc Oxide Slurries	7.04	9.13	7.04	9.00	8.67	6.84

utilized in the pebble mill experiments. The slurries mixed with a motor stirrer were prepared with a 2-inch propeller type blade operated at 2500 r.p.m. with the slurry in a 5½-inch diameter container. A Travis Process Corporation Disper-Mill was employed in the colloid mill mixings. The slurries were recycled through the mill for five minutes.

IDENTIFICATION OF ZINC OXIDES

	Process of Manufacture		Surface Area in Square Meters Per Gram
XX-4	American	Untreated	4.4
Protox-166	American	Treated	4.4
XX-50	American	Untreated	3.0
Kadox-15	Palmerton	Untreated	10.0
Kadox-72	Palmerton	Untreated	7.9
XX-78	French	Untreated	3.9

With 4 per cent Darvan No. 1 in the ball-milled slurries (Table I), Kadox-15 having a surface area of 10 square meters per gram had a substantially higher viscosity than the coarser oxides, which were essentially equal in this property as measured with the Brookfield viscometer. The viscosity measurements were made in a constant temperature room at 25°C. Kadox-15 showed less tendency toward settling than the other zinc oxides after standing in graduated cylinders for several days. The coarse particle size oxide, XX-78, settled more than the other pigments.

A similar group of zinc oxide suspensions was prepared by five-minute motor stirred mixings with 2 per cent Marasperse CB wetting agent (Table II). The propionic acid-treated oxide, Protox-166, had a somewhat higher viscosity than the other zinc oxides in this series of mixings, while the viscosities of the other oxides were much lower and essentially equal to each

TABLE IV—VISCOSITY AND SETTLING TESTS ON KADOX-15 SLURRIES WITH 1, 2, 4, 6, 8 AND 10 PER CENT OF TAMOL N

	Per Cent of Tamol N (on Pigment)					
	1	2	4	6	8	10
Kadox-15	550.0	550.0	550.0	550.0	550.0	550.0
Tamol N	5.5	11.0	22.0	33.0	44.0	55.0
Water	825.0	825.0	825.0	825.0	825.0	825.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	Unable to	439.2	120.7	115.2	163.0	356.5
1 Day after mixing	measure	431.7	122.3	114.1	126.1	258.0
2 Days after mixing	with No. 1	411.1	115.2	101.2	98.4	229.3
3 Days after mixing	spindle	443.9	118.4	102.0	83.8	207.0
7 Days after mixing		444.1	105.3	88.4	69.2	185.8
14 Days after mixing		Unable to measure with No. 1 spindle	118.7	95.7	84.4	177.4
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	99.0	98.0	97.5	95.5	99.0	99.0
2 Days after mixing	98.0	95.0	94.5	93.0	96.0	97.0
3 Days after mixing	98.0	92.0	91.0	91.0	94.0	95.0
7 Days after mixing	98.0	85.0	78.0	80.0	87.5	91.5
14 Days after mixing	97.0	84.0	76.0	68.0	59.0	67.0
pH of Zinc Oxide Slurries	9.08	9.19	9.31	9.44	9.60	9.61

TABLE V—VISCOSITY AND SETTLING TESTS ON XX-78 ZINC OXIDE WITH VARIABLE CONCENTRATIONS OF TAMOL N

	Per Cent of Tamol N							
	0	0.1	0.2	0.4	0.5	0.6	0.8	1.0
XX-78	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
Tamol N	—	0.6	1.2	2.4	3.0	3.6	4.8	6.0
Water	900.0	900.0	900.0	900.0	900.0	900.0	900.0	900.0
Brookfield Viscosity in Centipoises—Spindle:				1	1	1	1	1
R.P.M.:				20	20	20	20	20
Day mixed	Unable	Viscosity		1390.2	264.7	24.4	13.2	21.5
1 Day after mixing	to	too high		1347.6	287.0	24.3	27.0	21.5
2 Days after mixing	colloid	for meas-		1411.4	241.6	15.6	18.4	18.6
7 Days after mixing	mill	urement		1298.0	185.0	20.6	18.2	15.4
14 Days after mixing				1266.0	82.6	26.0	23.5	30.6
Settling Tests (Slurry in 100 cc. Graduated Cylinder)								
Zinc Oxide Level—14 Days after mixing				89.0	78.0	68.0	31.0	28.0
Caking in jar				None	None	Mushy	Hard	V. Hard

Zinc oxide slurries colloid milled for 5 minutes.

other. Again Kadox-15 settled less than the other oxides, but in this case Protox-166 had non-settling properties approaching that of Kadox-15. Although Marasperse CB had excellent wetting and dispersion properties, it discolored the pigment suspensions.

In a series of experiments (Table III) in which the pigment slurries were motor stirred for five minutes, the wetting agent was 2 per cent Tamol N. The Kadox-15 slurry had a stiff, paste-like consistency, while the other mixings had a low viscosity and were essentially equal in this property. In this series of slurries Kadox-15 settled the least and XX-78 settled the most after a 14-day interval.

With Kadox 15 and variable concentrations of Tamol N (Table IV), there is a progressive decrease in viscosity with 1, 2, 4 and 6 parts of the wetting agent, and a significant increase in viscosity with higher amounts of the agent. This comment applies to the freshly prepared slurries, but after several days' storage the mixing with 8 per cent wetting agent had a minimum viscosity. With 4, 6, 8 and 10 parts of wetting agent, there was a decrease in viscosity with storage time for the first seven days. Beyond this point the indications were that the slurries thickened slightly with prolonged storage.

Wetting agent concentrations also affected the settling characteristics of the suspensions. One per cent of Tamol N is insufficient for complete wetting and the high paste-like consistency inhibited settling even after a three-week storage interval. As the viscosity decreases with higher concentration of wetting agent, there is a greater amount of pigment settling because of the loss in suspending properties. However, the effect is not so permanent as might be expected from the viscosity change.

A similar group of suspensions with variable concentrations of Tamol N wetting agent from 0 to 1 per cent were compounded with a coarse particle size zinc oxide, XX-78, in colloid mill suspensions, and the results are listed in Table V. Without an added wetting agent the paste consistency was too stiff for passage through the colloid mill. When 0.1, 0.2 and 0.4 per cent Tamol N were added to the zinc oxide slurry, there was a gradual reduction in viscosity, but the slurries were too stiff for measurement on the Brookfield instrument with a No. 1 spindle. The suspension with 0.5 per cent wet-

TABLE VI—VISCOSITY AND SETTLING TESTS ON KADOX-72 ZINC OXIDE WITH 1 AND 2 PER CENT TAMOL N

	Per Cent of Tamol N	
	2	1
Kadox 72	600.0	600.0
Tamol N	12.0	6.0
Water	900.0	900.0
Brookfield Viscosity in Centipoises—Spindle:	1	2
R.P.M.:	20	4
1 Day after mixing	26.2	9038
2 Days after mixing	15.2	9324
3 Days after mixing	20.5	9024
7 Days after mixing	19.8	8814
14 Days after mixing	18.6	8554
Settling Tests (Slurry in 100 cc. Graduated Cylinder)		
Zinc Oxide Level—1 Day after mixing.	97.0	98.0
2 Days after mixing	94.0	96.0
3 Days after mixing	92.0	96.0
7 Days after mixing	80.0	95.0
14 Days after mixing	71.0	94.0
Caking in jar	None	None

Zinc oxide slurries colloid milled 5 minutes.

TABLE VII—VISCOSITY AND SETTLING TESTS ON ZINC OXIDES OF DIFFERENT d, WITH 2 PER CENT OF TAMOL N

	d,			
	.10	.12	.15	.185
Zinc Oxide A	550.0	—	—	—
Zinc Oxide B	—	550.0	—	—
Zinc Oxide C	—	—	550.0	—
Zinc Oxide D	—	—	—	550.0
Water	825.0	825.0	825.0	825.0
Tamol N	11.0	11.0	11.0	11.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)				
Day mixed	149.0	18.2	15.8	16.6
1 Day after mixing	196.9	17.8	16.0	14.5
2 Days after mixing	205.2	17.0	18.1	14.9
7 Days after mixing	274.5	17.2	17.3	13.4
14 Days after mixing	327.7	16.2	20.5	19.1
Slurries motor stirred 5 minutes.				
pH of Zinc Oxide Slurries	9.34	8.84	9.02	9.11

TABLE VIII—VISCOSITY AND SETTLING TESTS ON ZINC OXIDE SLURRIES WITH 1 PER CENT OF DAXAD-23

	XX-4	Kadox-15	XX-50	Kadox-72	XX-78	Protox-166
XX-4	600.0	—	—	—	—	—
Kadox-15	—	600.0	—	—	—	—
XX-50	—	—	600.0	—	—	—
Kadox-72	—	—	—	600.0	—	—
XX-78	—	—	—	—	600.0	—
Protox-166	—	—	—	—	—	600.0
Daxad-23	6.0	6.0	6.0	6.0	6.0	6.0
Water	894.0	894.0	894.0	894.0	894.0	894.0
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	19.0	128.2	13.9	17.2	18.4	51.8
1 Day after mixing	19.0	124.9	17.5	16.3	18.4	48.4
2 Days after mixing	19.3	136.5	14.4	12.6	13.7	42.7
3 Days after mixing	19.4	119.7	17.9	25.0	22.8	40.7
7 Days after mixing	15.7	158.8	17.7	17.2	12.8	34.1
14 Days after mixing	13.8	86.1	10.3	16.6	14.4	31.3
21 Days after mixing	16.9	108.6	15.5	15.0	14.3	25.8
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	95.0	99.0	98.0	98.0	97.0	91.0
2 Days after mixing	97.0	98.0	99.0	98.0	98.0	84.0
3 Days after mixing	96.0	97.0	99.0	98.0	98.0	78.0
7 Days after mixing	95.0	93.0	95.0	99.0	90.0	72.0
14 Days after mixing	88.0	84.0	88.0	97.0	88.0	71.0
21 Days after mixing*	47.0	76.0	36.0	28.0	27.0	71.0
Caking in jar	Soft	None	Hard	Hard	V. Hard	None
pH of Slurry	7.14	8.72	7.08	8.51	8.15	6.88

Zinc oxide slurries colloid milled 5 minutes.

* In this case the supernatant liquid was decanted before the column height in the graduated cylinder was measured.

ting agent had a viscosity within the range of the No. 1 spindle and with further increments of wetting agent the slurries were about equal and low in viscosity. The extent of pigment settling and the nature of the settled pigment also showed a characteristic change with increments of the wetting agent. More settling occurred and the settled pigment cake became more dense with each increment of the wetting agent.

When a zinc oxide of intermediate particle size, Kadox 72, was compounded with 1 and 2 per cent of the same wetting agent, 1 per cent of Tamol N yielded a high viscosity, while the 2 per cent solution had a low

TABLE IX—VISCOSITY AND SETTLING TESTS ON ZINC OXIDE SLURRIES WITH 1 PER CENT OF DAXAD-23 AND 1.25 PER CENT OF BENTONITE

	XX-4	Kadox-15	XX-50	Kadox-72	XX-78	Protox-166
XX-4	600.0	—	—	—	—	—
Kadox-15	—	600.0	—	—	—	—
XX-50	—	—	600.0	—	—	—
Kadox-72	—	—	—	600.0	—	—
XX-78	—	—	—	—	600.0	—
Protox-166	—	—	—	—	—	600.0
Bentonite	7.5	7.5	7.5	7.5	7.5	7.5
Daxad-23	6.0	6.0	6.0	6.0	6.0	6.0
Water	886.5	886.5	886.5	886.5	886.5	886.5
Brookfield Viscosity in Centipoises (No. 1 Spindle at 20 r.p.m.—25° C.)						
Day mixed	99.0	222.6	29.9	27.5	25.9	121.1
1 Day after mixing	93.6	240.2	23.3	28.5	22.7	98.2
2 Days after mixing	89.9	267.6	28.6	33.0	23.2	88.4
3 Days after mixing	83.6	270.9	27.2	33.9	24.9	83.6
7 Days after mixing	79.6	293.1	24.4	28.2	19.4	66.9
14 Days after mixing	75.1	324.1	27.2	35.9	20.1	56.4
Settling Tests (Slurry in 100 cc. Graduated Cylinder)						
Zinc Oxide Level— 1 Day after mixing	95.0	99.5	94.0	100.0	97.0	92.0
2 Days after mixing	92.5	99.0	94.0	99.0	93.0	86.0
3 Days after mixing	90.0	94.5	86.5	98.0	*	84.0
7 Days after mixing	82.0	90.5	74.0	*	*	80.0
14 Days after mixing	69.5	86.0	56.0	*	*	79.0
Caking in jar	None	None	Soft	Slight	Hard	None
pH of Slurry	7.1	8.5	7.07	8.3	8.1	6.83

Zinc oxide slurries colloid milled 5 minutes.

* Impossible to measure the exact level of the settled pigment.

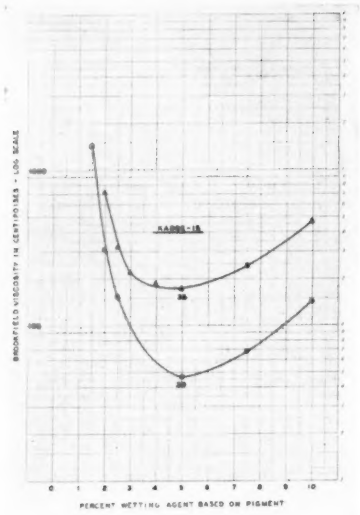

FIG. 1—Variable concentrations of Kadox-15 in water.

viscosity (Table VI). These data again emphasize the fundamental relationship between the extent of zinc oxide surface, and the amount and type of wetting agent, and the viscosity and settling of the zinc oxide suspension.

A range of particle size zinc oxides from d_s of 0.10 to 0.185 micron was evaluated and the results are listed in Table VII. The d_s diameter is the calculated diameter derived from a surface area measurement. Under these test conditions the finest particle size oxide yielded a high viscosity paste, while the several larger particle size oxides imparted a low viscosity to the slurries, and they were essentially equal in the Brookfield viscometer measurements. These data are in agreement with the previous observations in which a sharp break in the viscosity is noted rather than a gradual change in this property with variations in the amount of wetting agent or extent of the pigment surface. An explanation for the abrupt change in viscosity is offered below.

The influence of 1.25 per cent bentonite clay on the viscosity and settling properties of a series of zinc oxides colloid milled with 1 per cent Daxad-23 is shown in Tables VIII and IX. The presence of bentonite substantially raised the level of the Brookfield viscosity and the effect was more pronounced with XX-4 and Protox-166 than the other oxides in the series. The nature of the settling with Daxad-23 was such that it was difficult to establish the exact level of the settled pigments in the graduated cylinders.

In all of the experiments referred to up to this point the aqueous slurries contained 40 per cent by weight of zinc oxide. To further study the effect of pigment surface concentration, slurries of 40, 50 and 60 per cent of XX-78; 30, 35 and 40 per cent of Kadox-72; and 30 and 35 per cent of Kadox-15 were prepared with variable concentrations of Tamol N wetting agent, and the viscosity curves are charted in Figures 1, 2 and 3.

The curves show an abrupt lowering of viscosity with the addition of small amounts of wetting agent to a viscosity minimum. Beyond this point there is a gradual increase in viscosity. However, in the case of the 50 and 60 per cent XX-78 slurries there is a sharp increase in viscosity with increments of wetting agent. A minimum viscosity of 88 centipoises was noted for the 60 per cent slurry and 18 centipoises for the 40 per cent XX-78 suspension. Brookfield viscosity measurements on water ranged from 11 to 16 centipoises.

It seems probable that viscosities ranging from 20 to 150 centipoises would be most suitable for many commercial applications and that the additional information on the high viscosity pastes shown in these charts is only of theoretical interest. The minimum viscosity of the Kadox-15 slurries was developed with 4 to 6 per cent wetting agent, 2 to 2.5 per cent with Kadox-72 and 1 to 1.5 per cent with XX-78. There was a gradual lowering of the minimum viscosity with reduction in the pigment concentration.

The viscosity minima of the several zinc oxide slurries are plotted against the pigment surface concentration per cubic centimeter of water in the curve shown in Figure 4. It should be pointed out that the abscissa in Figures 1, 2 and 3 is per cent wetting agent based on the pigment. The occurrence of the viscosity minima for the several loadings of the individual zinc oxides in the same range further emphasizes the basic relation between the amount of oxide surface and the wetting agent requirements of the system. As the curve in Figure 4 indicates, the viscosity minimum is directly associated with the pigment surface concentration.

Discussion of Results

The data demonstrate that the viscosity and settling properties of the aqueous zinc oxide slurries are definitely associated with the extent of the pigment surface and the nature and the amount of wetting agent, and the mechanism is most apparent in the several series of suspensions in which a range of concentrations of wetting agents has been employed. Dannenberg and Seltzer *(2)*

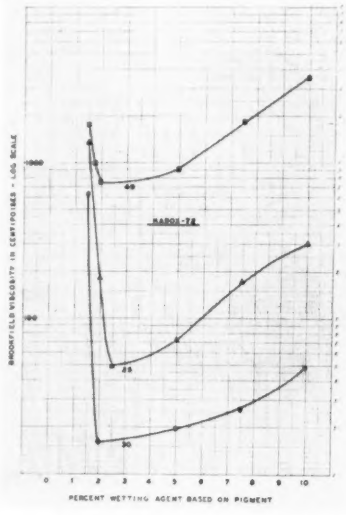

FIG. 2—Variable concentrations of Kadox-72 in water.

reported that the quantity of dispersing agent required to give stable and fluid carbon black in water slurries is related to the surface area of the carbon black. Adams, Messer and Howland *(3)*, in experiments with aqueous suspensions of carbon black for GR-S latex-black masterbatches, found that a linear relationship existed between the dispersing agent requirements of slurries and their carbon black contents within the range of 15 to 25 per cent carbon black.

Ewing and Rhoda *(4)* have published data showing that a sulfonated wetting agent can be adsorbed on zinc oxides as a mono-molecular layer and hence be used as a means of measuring the surface area of zinc oxides in suspension. When the zinc oxide particle is not completely coated with the adsorbed layer of wetting agent, or the forces of adsorption of the pigment are not completely satisfied, pigment flocculating forces are in evidence and, as the data in Table IV indicate, the less wetting agent that is present in the slurry, the greater the viscosity. Incomplete wetting also is apparent in the settling results. Flocculation increases as the wetting agent is reduced.

Beyond the viscosity minimum with 8 and 10 per cent of wetting agent, it is speculated that the second layer of the reagent builds up on the zinc oxide particle. In this case the opposite end of the polar wetting agent molecules projects into the solution and the particle probably assumes the opposite electrostatic charge. As the second layer builds up on the pigment particle, flocculation and viscosity increase rather than decrease, as occurred with the formation of the first layer.

Another explanation has been suggested for the increase in viscosity with higher concentrations of wetting agent, and this seems to more readily conform with the results charted in Figures 1, 2 and 3. The lowest concentrations of wetting agent yielded the highest viscosity slurries owing to a flocculated pigment structure. Increments of wetting agent improved pigment dispersion and hence lowered viscosity. Beyond the viscosity minimum a hydration phenomenon is believed to occur. The

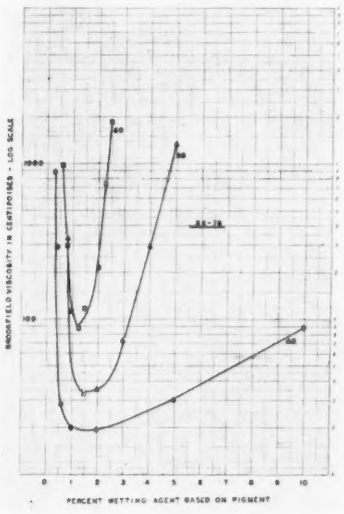

FIG. 3—Variable concentrations of XX-78 in water.

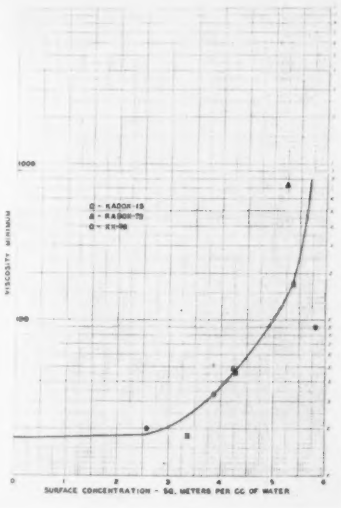

FIG. 4—The influence of pigment surface concentration on viscosity.

wetting agent adsorbed on the pigment particle is a colloidal material which readily hydrates and immobilizes some of the water and tends to reduce the effective water content of the system.

This phenomenon is similar to that of the hydration of a thickening agent added to water suspensions except that in this case the effect is more pronounced since the colloidal material is distributed on the surface of the oxide particle. The water content of the 60 per cent zinc oxide suspension is somewhat lower than that of the other slurries in Figure 3 and hence the greater sensitivity to hydration and reduction in water content. Some samples of Kadox-15 have been observed to develop a structure in aqueous suspension, and this characteristic is believed also to be associated with the hydration of the wetting agent on this fine particle sized zinc oxide.

The influence of flocculation is further emphasized by the settling data with the coarser particle size oxide, XX-78, in Table V. Here a lower concentration level of wetting agent has been employed because of the considerably reduced amount of pigment surface as compared with Kadox-15. As the concentration of wetting agent is increased, there is a progressive amount of pigment settling. The nature of the settled pigment cake also shows the same trend. Where there is a high degree of flocculation, the pigment cake is soft and much less dense than is the case with cakes from slurries with slight flocculation. In the latter instance the pigment forms a cake with the particles in intimate contact with one another. This type of pigment cake is very dense and difficult to redisperse.

These data demonstrate the fact that with the proper selection of wetting agent and the amount of this reagent, slurries of the desired viscosity and settling characteristics can be prepared. It may be advantageous to compound with a fine particle size oxide in order to have a maximum of chemical reactivity for the vulcanization of a latex compound, but very satisfactory properties may be obtained with oxides of coarser particle size.

Practical Considerations

From the foregoing discussion, a natural inquiry might be, what specific recommendations as to concentration of wetting agent and type of zinc oxide best suited for a given latex problem can be offered? Actually, the experience has been that variability in grinding conditions and the efficacy of wetting agents from lot to lot preclude the specifying of an exact amount of wetting agent.

For example, it was well established that the more severe grinding of a colloid mill yielded lower viscosity suspensions than a similar suspension prepared by a motor stirrer. Resetting the clearances of the shear discs in the colloid mill also significantly changed slurry viscosity. A simple and direct method of determining, in a preliminary way, the approximate wetting agent requirements for a given zinc oxide-water mixture was to set up a burette over a Hamilton-Beach mixer and slowly introduce small increments of a water solution of the wetting agent into the zinc oxide slurry during the mixing operation. The system suddenly changes from a heavy paste to a low viscosity slurry when the optimum amount of wetting agent has been added.

Another question which might arise from a discussion of this type is, should the mixing of the zinc oxide slurries be done in a pebble mill or a colloid mill? The understanding is that the preferred practice for thin latex films is to mill the zinc oxide slurries and suspensions of other solids from 1 to 3 days in a pebble mill to insure the ultimate in dispersion of the solid materials. A satisfactory degree of dispersion of zinc oxide in water is attained with the colloid mill for latex foam sponge, rug backing composition and related applications. With a laboratory colloid mill, good dispersions were developed when the slurries were recycled through the mill for 5 minutes.

A long list of wetting agents might have been included in this program but it would have been impractical to do so. Many of them might have served equally as well or better in zinc oxide suspensions as the wetting agents that were examined.

It is well recognized that the settling and viscosity characteristics of pigment slurries can be modified by thickening and suspending agents such as gum arabic, casein, bentonite or many related materials. A typical example is presented in the comparison in Tables VIII and IX where the influence of bentonite on viscosity and settling properties is demonstrated.

The generally accepted commercial practice in latex compounding, it is believed, is to work with zinc oxide slurries of 20 to 150 centipoises viscosity. If these suspensions are to be transported through supply lines, the tendency is toward the lower viscosity.

The microscope can be a valuable aid in working with aqueous zinc oxide suspensions for latex compounding. If a drop of the slurry is placed on a microscopic slide with several drops of water and viewed microscopically, the degree of dispersion can be readily determined. In many latex compounds the dispersion of the pigment in latex is pre-determined by the state in which it exists in the zinc oxide slurry.

ACKNOWLEDGMENT

The authors wish to acknowledge the kind assistance of G. S. Haslam and C. E. Barnett in the preparation of this paper.

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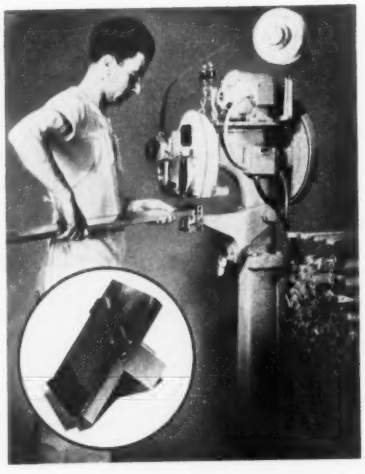
Metal Stitching Speeds Rubber-to-Aluminum Assembly

RUBBER feet are attached to aluminum ladder legs on Acme-Morrison metal-stitching machines in 85 percent less time than required for conventional drilling and bolting methods at the Burbank, California, plant of Bardwell & McAllister, Inc. Metal stitches of 0.051-in. diameter steel wire are driven through three layers of material—rubber, aluminum and rubber. Total stitch penetration is $\frac{1}{4}$ in. of rubber and 0.093 in. of extruded aluminum channel. Wire costs are less than 1½c per hundred stitches.

Stitch formation is as follows: high-tensile-strength wire is automatically fed from a coil, cut to length, formed into a stitch, driven through, and clinched in 1/5 of a second. The cold-drawn 290,000 psi wire used has a corrosion-resistant zinc coating. In addition, it is manufactured to AN-W-13 specifications, can withstand 180° bends, is resistant to fatigue stresses, and can safely endure a 300-hour salt-spray test without detrimental corrosion.

Assembly by the former drilling and bolting method took 135 seconds per joint. Metal stitching cut this time to 15 seconds per joint, which is a time saving of over 85 percent. Or conversely, the old method took 900 percent more time than the present method. The fact that these stitches form their own holes as they are driven eliminates drilling operations and the necessity for matching bolts to holes.



Method used to attach rubber feet to extruded aluminum ladder legs, using an Acme-Morrison metal stitcher.

Recent Developments in the Field of Oil-Enriched Rubbers

By K. V. WEINSTOCK, L. M. BAKER, and D. H. JONES
General Tire & Rubber Co., Akron, Ohio

The production and utilization of oil-enriched rubbers have had a remarkable growth since this development was first offered by the General Tire & Rubber Co. to the Office of Rubber Reserve late in 1950. More than 50,000,000 pounds of the oil-enriched polymers have been produced in the United States and Canada. No other developments in the synthetic rubber industry have had such rapid acceptance. This process, which utilizes low cost petroleum softeners to extend extremely high Mooney synthetic rubbers, has tremendous economic advantages, and at the same time has increased our supply of rubber without expansion of existing copolymer plants, with no increase in butadiene and styrene requirements, and with an actual improvement in the quality of the rubber. In fact, the oil-enriched polymers have been proved superior to cold rubber in passenger tire tests and there are indications that it may well be an improved rubber for large size truck tires. The early development of this new type of rubber is summarized very briefly. The chief aims of this paper are to supplement the reported works with more recent findings and to present data in regard to certain questions which have become of concern to other workers in this new field.

THE principles and the scope of the new oil-enriched high Mooney polymers have been reported by Swart, Pfau and Weinstock *(1)*. The early production and utilization of oil-enriched synthetic rubber masterbatches have been reported by other workers in the field *(2, 3)*.

On the basis of the showing of the surprising quality and economic advantages to be gained by the use of the new rubber in tires, the rubber industry has been intensively engaged in the development of compounds and methods or procedures for its utilization. The rapid acceptance of the new rubber is shown graphically in Figure 1. The production of these new rubbers will undoubtedly be increased as soon as facilities for producing them are available and the rubber compounder becomes better acquainted with their compounding and processing.

Since publication of the papers mentioned above and the production of large quantities of oil-enriched rubber, attention has been focused on compounding, processing, and product problems. These can be evaluated adequately only by large scale industry-wide usage of the new rubber. Although some of the following problems were briefly outlined in the initial publications, it is the purpose of the current paper to present additional data on methods of compounding, plasticizers, factory processing, adhesives, weather-checking or ozone resistance, aging, and road tests. The discussion is concerned primarily with applications in tires, although brief mention will be made of a few mechanical goods evaluations.

Compounding

There have been two general methods of compounding oil-enriched rubbers. In the first publication *(1)* the recommendation was made that the oil-enriched rubber be considered as a direct replacement for an equivalent quantity of regular GR-S or natural rubber. The other method has been to consider the oil-enriched rubber as a mixture of polymer and oil; thus, the compounding ingredients are calculated on the rubber hydrocarbon content only. The first method, however, has the following advantages:

1. The rubber would be used as a new rubber and the compounder would not be hampered by preconceived ideas about the use of extended rubbers.

2. The prejudice against high loadings of both oil and black would be removed.

3. Blends of the oil-enriched rubber with standard GR-S or natural rubber could be made with only minor compounding adjustments.

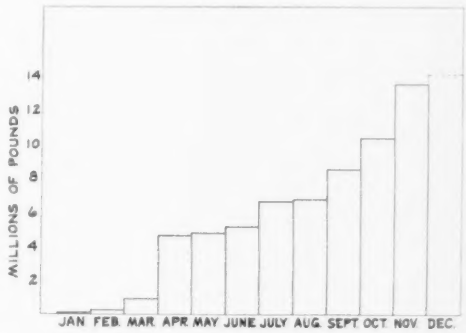


FIG. 1—Estimated production of oil-enriched rubber in 1951.

4. The amount of antioxidants and protective waxes would be calculated on the total amount of polymer and oil instead of on the rubber content alone.

This method, however, is so different from the usual method of considering the rubber hydrocarbon content of masterbatches that considerable confusion has arisen. Because of this situation and the variable quantities of oils being used in various oil-enriched rubbers in production today, we believe the latter method, which considers the oil and rubber as separate constituents of a masterbatch, to be better understood by the rubber compounder; however, we believe that either method will be satisfactory, provided it is properly understood.

The really important consideration in compounding the new rubber is the balance among Mooney level of the rubber, oil content, and pigment loading. There is a direct relationship between the Mooney level of the polymer and the quantity of oil necessary to give satisfactory processibility to a compound. For a rubber of any given Mooney level, the quantity of oil added should be adjusted to give the desired processing characteristics. These considerations were shown clearly by Swart, Pfau, and Weinstock *(1)*. The type and quantity of loading should be selected to produce the desired physical characteristics in the cured compound. We realize that these principles are not unlike those used for the compounding of any other natural or synthetic rubber. The significant difference, however, has been the tendency of the compounders to disbelieve them because of the extraordinarily large amounts of oils and pigments required with the new rubbers. It is quite possible that failure to observe these very simple principles has been responsible for most of the difficulty encountered during the compounding and processing of these new rubbers.

The quantities of accelerators and curatives should be determined in the same manner as for other rubbers, so as to give the desired rate of cure and level of physical properties. It is believed that the effectiveness of antioxidants and protective waxes is dependent upon the concentration of these materials in the total compound instead of upon the ratio of these to rubber hydrocarbon as usually formulated; therefore, the percentage of these materials in a compound should be kept constant, regardless of whether the conventional or the oil-enriched rubbers are used. There have been some indications that the efficiency of certain waxes may be influenced by some oils; however, tests have shown that at proper wax concentrations adequate weather checking protection has been afforded. Inasmuch as waxes are used extensively in mechanical goods compounds, this observation seems particularly important.

Table I—Typical Compounding and Mixing Specification for an Oil-Enriched Rubber

Tire Formulations	A	B	C
GR-S	100.0	—	—
Oil-Enriched Rubber	—	145.0	145.0
HAF Black	50.0	75.0	75.0
Oil	10.0	5.0	5.0
Chemical Peptizer	—	—	0.5
Other Ingredients	8.1	8.5	8.5
Mixing Procedure—First Pass Mix			
Banbury	No. 11	No. 11	No. 11
Speed	40 rpm	40 rpm	40 rpm
Mixing Procedure			
Add Polymer	0 min	0 min	0 min
Add chemical peptizer	—	—	0 min
Add black & dry ingredients	1½ min	2 min	1½ min
Add oils	3½ min	4 min	3½ min
Discharge batch	4½ min	5½ min	4½ min
Mixing Procedure—Second Pass Mix			
Banbury	No. 11	No. 11	No. 11
Speed	30 rpm	30 rpm	30 rpm
Mixing Procedure			
Add masterbatch & dry ingredients	0 min	0 min	0 min
Discharge batch	2½ min	2¼ min	2½ min
Mooney Viscosity—1½′ and 4′			
First pass	129-100	119-105	107-90
Second pass	70-63	96-85	65-62

Processing

The processing characteristics of the oil-enriched rubbers have caused some concern among various consumers and a few have expressed the opinion that it cannot be handled satisfactorily in their plants. Some of the plants have run these rubbers with little or no difficulty and with only minor changes in their processing methods. When properly compounded, the oil-enriched polymers process very much like standard cold GR-S during all operations—such as extrusion, calendering, tire building, and curing—and differ from standard GR-S only in their mixing characteristics.

When the compounding principles outlined above are followed carefully, the mixing of oil-enriched polymers presents very few difficulties. The significant difference as compared with standard cold rubber compounds is the tendency of the material to issue from the Banbury in crumbly form instead of a large, cohesive mass. Fortunately, the crumbly material will very quickly form a band on the sheet-off mill and after the initial pass through the mill acts very much like standard cold rubber compounds. The use of black masterbatches of the oil-enriched rubbers greatly reduces this tendency toward crumbling. The mixing of tread compounds using a carbon black masterbatch of oil-enriched polymer quite possibly can be done with the single Banbury pass method; however, the two-pass Banbury method is preferred.

The small particles of the crumbly mass discharged from the Banbury during the initial masterbatching process present some handling problems. The crumbs or small chunks have a tendency to fall off or to bounce off the mill roll instead of passing through the mill. This problem can be overcome quite satisfactorily by the use of a rather large backboard or shield on the mill and the use of a small hand-positioned shield on the front of the mill. After the mass once passes through the mill, this problem is no longer important. Compounds containing the oil-enriched polymers handle almost exactly like standard cold rubber compounds during the second pass mixing operations in the Banbury and on the mills. (See Table I for a suggested mixing procedure for oil-enriched rubber compounds).

Oil-enriched rubber can be more easily processed by the addition of a chemical peptizer in the first pass Banbury mix. Table I shows appreciable reduction in Mooney viscosity by the addition of .5 parts of chemical peptizer on 100 parts of rubber hydrocarbon. This appreciable reduction in Mooney viscosity has been of considerable importance in the factory processing of some of the oil-enriched rubber stocks. It should be noted also from Table I that the oil-enriched polymers can be mixed into tread compounds on the same overall Banbury time cycle as standard GR-S.

Splicing

In many products it is necessary to obtain adhesion between two oil-enriched compounds, or between such compounds and GR-S or natural rubber compounds.

FIG. 2—Apparatus used for evaluating tread splicing adhesives.

Usually, good adhesion is required during the fabrication of products, during normal service, and after aging of the product. These problems have been of paramount importance and likewise have been of extreme concern to most compounders. For example, in the manufacture of a tire, it is necessary to have adequate adhesion between the ends of the green treads at the tread splice, both during the curing operations and in the tire after it has been cured and put into service. In fact, these problems have retarded the use of the oil-enriched cold rubber on a 100% basis, and have led to its use as a blend, containing one-third to one-half of such rubbers with standard cold GR-S. In such combinations, the splicing difficulties have been minimized.

The usual method for obtaining adhesion between the ends of green treads is to use a rubber cement containing a natural rubber compound in a suitable solvent. Such cements have been unsatisfactory when stressed at elevated temperatures as when a tire has been expanded and placed upon a hot curing bag. Under such conditions, the heat from the hot curing bag warms up the tire tread to such an extent that the splice will come apart and a so-called "open splice" results. This experience was rather common with standard GR-S treads when the Mooney viscosity was at a high value. The problem was overcome by using treads which had low viscosity; however, similar reduction of Mooney viscosity of the oil-enriched GR-S treads did not produce the same results.

An explanation has been advanced to the effect that the organic solvent in the rubber cement has extracted some of the oil from the oil-enriched GR-S, and this oil has been deposited either in or upon the surface of the crude rubber cement film. In either event, the result has been a definite weakening of the splice and failure of it during the ordinary bagging and curing operations. The problem can be minimized by the use of the new Bag-O-Matic tire curing presses, which expand the tire quickly without subjecting the tread to elevated temperatures.

General Tire has developed a new adhesive which will give good performance on the uncured tire even under elevated temperature conditions, and which will still give good performance in the finished tire. This adhesive will not extract the oil from the oil-enriched polymer in the tread compound. Instead of the usual solvent cements, we have substituted latex adhesives prepared from various kinds of synthetic and natural rubbers. It has been found that by the addition of wetting agents to such latex adhesives, adequate wetting of the uncured oil-enriched tread compound can be obtained and there is no extraction of the oil or deposition of it in the latex film. Adhesives have been developed which give good adhesion to the green uncured splice under normal temperature conditions and which are entirely satisfactory for use in the tires.

The procedure used for the development of these cements was as follows: A tread-type compound of rather high Mooney viscosity and containing 100% oil-enriched polymer was extruded into slabs similar to cambelback. These slabs were then cut into pieces on a standard tread cutting knife, so as to produce splices identical to those which would be used in the manufacture of tires. These tread splice ends were then treated with the experimental adhesives, allowed to dry, pressed together by hand, and then bent in the form of a "U", so that the tread splice portion was in the center or lower portion of the "U" and the splice was bent over a rather short radius. The splices were held under the bent conditions for various periods of time at room and elevated temperatures, and those which did not open were selected for further evaluation (see Figure 2).

This preliminary procedure was very effective in screening the various adhesives and several rather important observations have been made. It has been found that with adequate wetting the film thickness on the splice can be varied over a wide range. It has also been found that the Mooney viscosity of the polymer in the latex has much to do with the adhesion and the cohesion of the splice. Many latices or dispersions will give good adhesion to the uncured oil-enriched tread-type compound; however, it seems that only those which are made from the rather high Mooney polymers, or those reinforced with styrene resins or high styrene copolymers, or with other resins, have sufficient cohesive strength to hold the splice together when bent under the aforementioned conditions. At times it may be desirable to freshen the latex film surface with a conventional solvent-type rubber cement.

Those adhesives which were found to be satisfactory under the above conditions were then evaluated to determine the normal and aged adhesion produced between layers of two oil-enriched rubbers and between layers of oil-enriched rubber and natural rubber. In the laboratory, it was possible to determine the adhesive forces such as might exist in a tread splice and also between the tread and the natural rubber cushion or breaker compounds which might be used in the tire.

The following special technique was developed for this evaluation work: Pieces of square-woven fabric which had been frictioned with natural rubber compounds were coated on a calender with .050-inch gauge

of oil-enriched compound and others were coated with natural rubber breaker-type compounds. The surfaces were then treated with the various adhesives in the same manner as tread end splices would have been treated. Then the treated surfaces were placed together and rolled by hand stitcher. A strip of Holland cloth was placed between the slabs for a distance of approximately one inch at one end so that it would be possible to separate them for an adhesion test at a later time. These built-up slabs were then cured in a special mold which was equipped with an air bag on one side so that distortion of the sample would not occur. The slabs were then cured for 90 minutes at 287° F. with 75 pounds air pressure on one side. One-inch test strips were then cut from these slabs and were tested on a regular Scott Tester operated at a jaw separation rate of 2 inches per minute. Such tests were run on the samples before and after aging at 212° F. in a circulating air oven.

The data obtained from the above tests indicate that the latex adhesives give excellent adhesion with uncured oil-enriched rubber compounds and adequate adhesion in the finished products. These results have been verified by tire tests under severe conditions on a test fleet in California and in high speed tests on an indoor wheel. Some of the adhesives have been tried in tire carcasses and the results have been favorable.

Weather Checking

Weather or ozone checking of tires and other rubber products both in storage and in actual service has been an important problem with all types of natural and synthetic rubbers. There have been indications reported to the effect that the oil-enriched polymers have slightly less resistance to such weather or ozone checking than standard cold GR-S compounds. This has been partially confirmed by laboratory and field service tests on tires. Undoubtedly, some of this weather checking has resulted from a deficiency of antioxidant. Santoflex AW has been found to be particularly effective in minimizing weather or ozone checking. The results have shown that the oil-enriched polymers when properly compounded have weather checking and ozone cracking resistance at least as good as standard cold GR-S compounds.

TABLE II—EFFECT OF AGING UPON TIRE PERFORMANCE

Test Conditions: Speed—60 miles/hour; Inflation—22 lbs; Load—1362 lbs/tire (125%); Atmospheric Temperature—52° F. to 104° F.; Road Surface—Desert Mix; Test Car—Chrysler New Yorker; Rotation—All Positions.

Tire	A	B	C
Size	8.00-15	8.00-15	8.00-15
Tread Polymer	Cold Black Master-batch	Oil-Enriched Rubber	Oil-Enriched Rubber with RPA
	Unaged		
Number of tires	2	2	2
Durometer hardness	65	56	56
Tire condition	OK	OK	OK
Relative tread wear	100%	127%	125%
	Aged 7 Days @ 212° F.		
Number of tires	2	2	2
Durometer hardness	73	69	69
Tire condition	Cracks total—48"	Cracks total—27"	Cracks total—15"
Relative tread wear	100%	117%	126%

Aging

When the oil-enriched polymers are properly compounded with the right balance of oils, carbon blacks, curatives, and antioxidants, the aging characteristics are as good as or better than standard GR-S compounds. This has been confirmed not only by extensive laboratory testing of compounds which have been subjected to oven aging, but also by testing tires which have been aged in hot air ovens for seven days at 212° F. Table II shows the results of a tire test run during the hot weather of the 1951 summer season. The results of this test further confirm the superiority of oil-enriched rubber over standard cold rubber both before and after oven aging. In addition, this test shows no harmful effect from the use of a chemical peptizer, RPA No. 3.

Low Temperature Characteristics

The performance of many rubber products, particularly tires, under winter driving conditions is of great concern to the compounder as well as the consumer of finished products. There have been indications, particularly in the northern states and in Canada, that synthetic rubbers are inferior to natural rubbers, and there has been apprehension about the performance of oil-enriched polymers in compounds used under such conditions. The evaluation of tires for performance on ice, snow, etc., at low temperatures is not an exact and precise procedure; however, we have had indications that oil-enriched polymers in tires have actually performed better than standard cold GR-S tires during last year's rather severe winter conditions in Ohio. The oil-enriched rubbers are of particular interest because of the possibility of using them to advantage in making better tires for winter usage. These rubbers can be compounded to have lower durometer and higher resilience at low temperatures and, therefore, should have better skid resistance than standard cold rubber and, in many cases, natural rubber.

The low temperature flexibility of the oil-enriched rubbers is dependent upon the type and amount of softener used to plasticize the polymer. The good low temperature plasticizers are usually those having low viscosity at low temperatures. The low viscosity petroleum fractions give improved low temperature flexibility, but are usually too volatile for tire applications.

The high Mooney rubbers plasticized with certain low temperature softeners have an excellent over-all balance of processibility, physical properties, and low temperature flexibility. Rubbers with physical properties approximately equal to GR-S and with low temperature properties about equal to polybutadiene rubbers have been prepared, using a carefully selected plasticizer and the proper high Mooney synthetic rubber. Tires containing such rubbers have been tested under severe conditions in both hot and cold weather with very encouraging results. Laboratory tests at very low temperatures indicate that these rubbers are much superior to GR-S and, in contrast to natural rubber, have very little tendency to crystallize on prolonged storage (see Table III). The tire tests indicated that the abrasion resistance of these tires was about equivalent to regular GR-S and only slightly inferior to the high Mooney rubbers plasticized with the usual softeners.

Plasticizers

Heretofore, the plasticizers or softeners used in rubber were of minor importance and were used primarily as processing aids; however, with a high Mooney polymer, the softener or oil becomes an important part of the compound and the quality and utility of the finished

product may depend upon the plasticizer used in preparing the oil-enriched rubber, and thus the development and evaluation of new plasticizers is one of the more important aspects of this new process for making superior rubbers. By variations in Mooney viscosity of the polymer used, kind and amount of plasticizer, and the pigment loading, the compounder has an almost unlimited working range. In fact, in some compounds, the rubber may be considered as the minor part and the oil the major portion of the compound. Altin polymers containing more than 100 parts of oil per 100 parts of rubber hydrocarbon have already been prepared and evaluated.

The oils commonly used in rubber compounding are the low-cost petroleum residues. Very little is known about the structure of these low-cost materials, and since they function primarily as processing aids and are used in relatively small quantities, very little effort has been expended on the analysis of these oils. A method of analysis by Rostler (4) has been used to fractionate this type of oil, but it is very difficult to obtain quantities of material sufficiently large for adequate evaluation. Several oil companies are actively engaged in the analysis and evaluation of the various fractions of these petroleum residues and factory scale runs of the more promising fractions are now underway. Preliminary data indicate that each of the fractions has specific effects on the property of the oil-enriched rubber and proper blending or selection of the fractions from various crude oils may produce a more efficient plasticizer for the high Mooney rubbers.

The evaluation of softeners has not been limited to the low-cost petroleum residues, but has been extended to cover the entire field of plasticizers. Some of these materials show promise in applications where a specific property is desired in the finished product, such as stiffness, resilience, low hysteresis, and low temperature flexibility.

It is our opinion that better plasticizers or softeners will be found for the high Mooney rubbers and, because of their importance, it may be necessary to have a series of such materials each of which is designed for a specific use. Some work has already been done on these problems; however, because of the important effect of these materials upon quality and performance, and the now relatively large volume application of such materials, this field, no doubt, will be very thoroughly investigated, not only by the rubber companies but also by the petroleum companies.

Summary

Performance Tests of Tires: On the basis of data available from all sources, we believe the following statements summarize the results of the extensive tire tests which have been run:

(1) Tread wear performance in passenger tires has been shown to be at least 10% better than standard cold rubber. Preliminary evaluations in truck tires show similar results.

(2) The tread cracking resistance of these materials in passenger tires has been satisfactory. Early truck tire tests showed considerable tread cracking and tread separation. Recent tests, utilizing improved compounds and methods of construction, have been very encouraging.

(3) When properly compounded, the oil-enriched rubbers are at least equal to regular cold rubber in weather or ozone cracking resistance.

(4) The plasticizers used in compounding the high Mooney rubbers have a definite effect on the physical properties of the rubber and on the performance of the tires in service. Good low temperature plasticizers are preferred for tires to be used in cold climates.

Table III—Effect of Temperature on the Durometer Hardness and Bashore Rebound of Various Tread Compounds

(Note: All stocks were stored for 24 hours at the temperatures shown before being tested)

	T17 Natural Rubber tread stock	RB-1 Cold Rubber tread stock	RB-9 High Mooney rubber *	RB-10 High Mooney rubber †
	Tested @ 77° F.			
Shore Durometer	58	63	58	58
Bashore Rebound	50%	45%	43%	45%
	Tested @ 32° F.			
Shore Durometer	60	70	62	60
Bashore Rebound	30%	20%	22%	35%
	Tested @ —8° F.			
Shore Durometer	65	78	75	62
Bashore Rebound	10%	5%	5%	17%

* Plasticized with a good petroleum softener.
† Plasticized with a special low temperature softener.

Carcass Compounds: The oil-enriched rubbers can be compounded to produce vulcanizates with extremely low heat build-up, high resilience at elevated temperatures and good resistance to heat aging. These properties are believed to be particularly important in carcass compounds. No other synthetic polymers tested have the excellent over-all balance of physical properties and processibility that can be obtained by use of the oil-enriched rubbers.

Rather extensive passenger tire tests indicate that the new rubbers are superior to GR-S in carcass compounds. Also, tires using the oil-enriched rubbers in both tread and carcass have outperformed all other natural or synthetic rubber tires. The evaluation of these rubbers in large size truck tire carcass compounds has been retarded by the early failure of many of the truck tires tested. The failures in many cases were due to tread separations or to tread cracking and not from any carcass deficiency. New and improved adhesives for both tread and carcass adhesion have made it possible to obtain a better carcass evaluation.

Limited data from very recent truck tire tests indicate improved performance from carcass stock utilizing oil-enriched rubbers. We believe that because of their superior physical properties, the oil-enriched rubbers offer the best possibilities in sight for the replacement of natural rubber by a synthetic polymer.

Other Applications: The oil-enriched rubbers are still in the experimental stage in many applications other than the tire field. The acceptance of these new rubbers has been necessarily slow because of the many production problems involved in the use of any new material. The tremendous savings made possible by this development make it inevitable that these new and lower cost rubbers will soon find a place in a wide variety of rubber compounds. The oil-enriched rubbers currently in production are designed primarily for the tire industry. New and improved rubbers for mechanical goods uses will be produced in the near future. The scope of this process is so broad that it should be possible to design an oil-enriched rubber for almost every application.

Conclusion

High Mooney viscosity rubbers enriched with oil have been in production for more than a year and are being accepted by the tire industry as a replacement for GR-S or cold rubber. The resistance to abrasion of this new rubber is superior to both cold and hot synthetic rubber and natural rubber in passenger car tires. Preliminary results indicate that this superiority may also be obtained in truck tires.

Preliminary evaluations of oil-enriched rubbers in carcass compounds indicate their superiority over regular cold rubber and, due to their inherently lower heat generation and resistance to heat aging, may eventually prove to be superior to natural rubber.

A new material usually presents many problems in compounding and processing. The new rubbers enriched with oil are no exception to this rule and problems have been encountered in splicing, flex cracking, and ozone resistance. There is sufficient background available now to enable a compounder to use these materials to make higher quality tires.

The plasticizer field is being extensively investigated in a search for new and superior plasticizers. The large amounts of plasticizer used may have considerable effect on the properties of the vulcanizate. Rubbers with improved skid resistance for winter use may well be one of the next major new developments resulting from careful selection of plasticizer and high Mooney viscosity polymer.

ACKNOWLEDGEMENT

The authors wish to express their thanks to the General Tire & Rubber Company for permission to publish this paper.

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Infra-Red Heat Used for Curing Latex Foam Sponge Rubber

PRODUCTION of latex foam sponge rubber at the plant of the H. C. Lien Rubber Co. in Los Angeles, Calif., is reported to have been accelerated 50 percent by converting from hot water to infra-red heat for the curing stage. Quality is also said to have been improved, since the former method left water spots on the finished product, resulting in a large percentage of rejects.

In the new method the latex foam compound is poured into aluminum molds which are immediately conveyed through the zoned infra-red oven. Figure 1 shows molds entering the 42-foot oven used in the plant while Figure 2 is a corresponding diagram of the oven showing the arrangement of the thirty 1.8 Kw Chromalox electric radiant heaters used in the installation. These heaters are produced by the Edwin L. Wiegand Co., 7500 Thomas Boulevard, Pittsburgh 8, Penna.

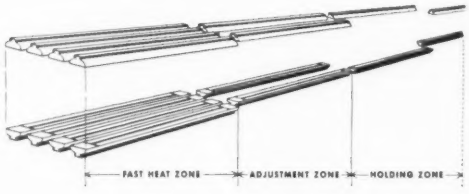


FIG. 2—Arrangement of the heaters.

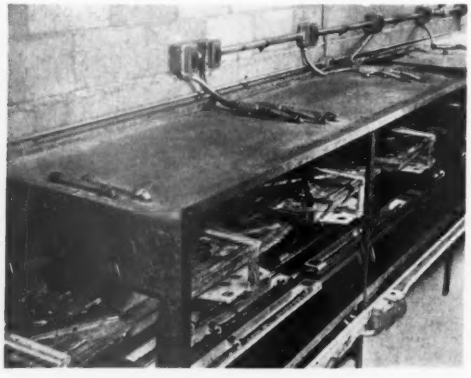
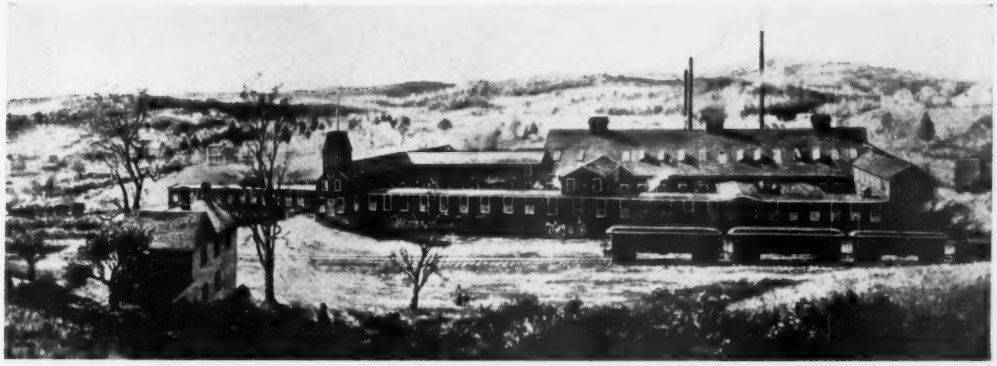


FIG. 1—Molds entering the oven.

The first zone provides rapid heating; the second zone adjusts the mold temperature to 200°F.; the remaining zones maintain this required temperature. The heaters are distributed equally at top and bottom throughout the oven to assure uniform heating of the molds. Input controllers are used to keep the mold temperature within the close limitations. After leaving the oven, the molds are water cooled to bring the temperature down to about 70°F.

The new curing method now permits delivery of 25 molds an hour or 400 a day on two 8-hour shifts, compared with the previous capacity of 16 molds an hour or 384 a day on three 8-hour shifts. An additional advantage of using the all-metal radiant heaters lies in their ability to withstand rough handling and splashes from passing molds.



View of the Butler, N. J., plant of the American Hard Rubber Co. as it appeared around 1880. The reproduction is from an oil painting by Edward Lamson Henry, famous 19th century painter.

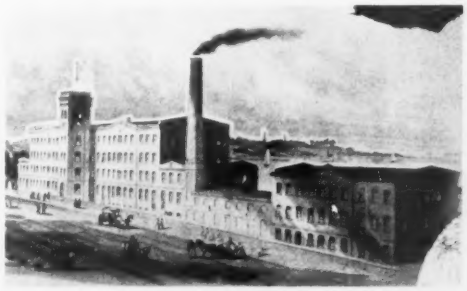
History of Hard Rubber Industry Reflected in Growth of American Hard Rubber Co.

THIS year, the American Hard Rubber Company celebrates its 100th Anniversary. The history of this company so closely parallels the rise of the hard rubber industry in the United States that, in actuality, one cannot be separated from the other. The American Hard Rubber Co., as it is known today, is the end result of a number of consolidations and purchases dating to the earliest days of hard rubber itself. As a corporate entity, the company dates from April, 1898, at which time it was incorporated under the laws of New York State. Since 1851, however, predecessor companies had been producing a wide variety of rubber products.

In examining the history of the company it is necessary to start with the earliest discovery and use of hard rubber. The discovery of hard rubber is generally credited to Nelson Goodyear who collaborated with his older brother Charles during several years of experimentation and research. In 1847, Nelson Goodyear started to experiment with a hard or "bony" rubber and in December, 1850, placed an application in the United States Patent Office which resulted in U. S. Patent No. 8,075 dated May 6, 1851. Later, on May 18, 1858, two reissues were taken out, separating the material and the process claims.

At the same time that Nelson Goodyear was experimenting with the new substance, L. Otto P. Meyer was also working, independently, with the new material. Mr. Meyer, a stepbrother of H. Adolph Meyer, of whom we shall hear more later, was learning the rubber business at the laboratories of Charles Goodyear under the direction of Augustin Goodyear Day. L. O. P. Meyer conceived the idea of using tin plate in place of plaster cast molds and tin foil in place of rigid metal sheets in forming certain hard rubber articles. For this process he obtained U. S. Patent No. 10,339 on December 20, 1853. On February 28, 1854, he obtained U. S. Patent No. 10,586, covering the vulcanization of hard rubber articles by means of immersion in water (or other liquid) during the process of heating and curing. From these earliest patents, the hard rubber industry was born.

When Nelson Goodyear obtained the first patent for hard rubber he specified a minimum of 50% sulfur-to-rubber. In a subsequent reissue patent he was somewhat more explicit, mentioning that less than four ounces of sulfur to a pound of rubber would utterly fail to produce the new substance. Therefore, he considered a rubber compound containing more than 25% sulfur to be in the hard rubber class. This definition still stands.



Reproduction of a steel engraving of the College Point plant as it appeared in 1861. This plant was known as the Enterprise Works.

Typical of early hard rubber products were these match carriers, nasal syringes, pocket flasks, ornamental hair pins, and combs.

Earliest Companies

While these experiments were taking place, a firm known as Meyer and Poppenhausen, on March 22, 1852, secured a license from Nelson Goodyear to make "imitation whalebone" from the newly-discovered substance. Meyer and Poppenhausen (H. Adolph Meyer and K. Poppenhausen) had, since 1842, been engaged in the importation and sale of whalebone products. They secured further licenses from the Goodyear estate to manufacture other articles and in 1854 constructed a plant at College Point, Long Island, N. Y., for the manufacture of combs. The plant was called the "Enterprise Works."

Poppenhausen obtained in 1856 an exclusive license for the L. O. P. Meyer patents in the United States and thus enjoyed a virtual monopoly on hard rubber products for a quarter of a century. Life of patents at that time was 21 years. H. Adolph and L. Otto P. Meyer returned to Europe at about this time and started the manufacture of hard rubber in Germany. Their efforts in that country developed into the Harburg India Rubber Comb Co. This firm eventually became Heinrich Traun & Sohne of Hamburg, the largest rubber concern in Europe at one time. The Meyers were the originators of pressing teeth in comb blanks, a process still in use.

When the Enterprise Works were formed in the United States, and with the return to Europe of the Meyers, the firm of Meyer and Poppenhausen became the firm of Poppenhausen & Koenig.

While these events were transpiring, other companies were formed for the manufacture of hard rubber products. Augustin Goodyear Day formed a company at Seymour, Conn., to manufacture stationers' supplies. The rubber compounds used by this company were made by the Beacon Dam Co. of Beacon Falls, Conn. This company was started in 1853 and manufactured syringes, drug sundries, photographers' supplies, electrical articles and buttons. Hard rubber buttons had become popular through a new method for manufacture devised by Alva Goodrich De Wolfe. This process utilized hard rubber scrap by grinding up the scrap and then pressing it.

In 1858, Poppenhausen & Koenig purchased the plant and good will of the Beacon Dam Co. and changed its name to the American Hard Rubber Co. of Conn. In 1860, the stock and machinery of this company were moved to College Point, Long Island. Poppenhausen & Koenig continued to operate the American Hard Rubber Co. of Conn. from that point, and to sell its products. In 1867, the two firms, Poppenhausen & Koenig and the American Hard Rubber Co. of Conn., were consolidated under the name of the India Rubber Comb Co.

In 1869, the Day Rubber Co. of Bloomingdale (now Butler), N. J., obtained a license for making rubber dental gum. This company changed hands twice and became the Rubber Comb and Jewelry Co. in 1876. A few years later, the name was changed to the Butler Hard Rubber Co.

The B. F. Goodrich Co. of Akron, Ohio, entered the hard rubber business in 1880 with the formation of the Goodrich Hard Rubber Co. Also in 1880, Mr. Fritz Achelis was elected president of the India Rubber Comb Co. One year later, Mr. Achelis acquired the interests of Poppenhausen & Co., successor partnership to Poppenhausen & Koenig, and became the controlling stockholder of the India Rubber Comb Co.

In 1898, Mr. Achelis consolidated the India Rubber Comb Co. with the Butler Hard Rubber Co. At the same time he purchased the properties and assets of the Goodrich Hard Rubber Co. This resulted in the formation of the American Hard Rubber Company as it is known today.

Technological Advancements

While these mergers and expansions were taking place, hard rubber was making a great deal of technological headway. In 1875, the use of hard rubber dust

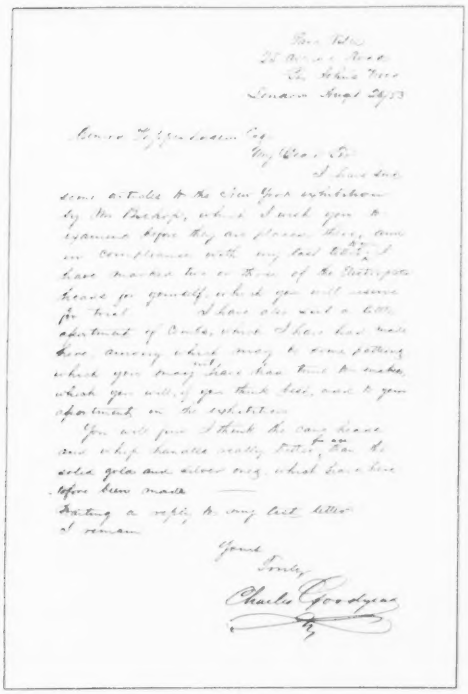
This advertisement appeared in the July, 1894, issue of "The Druggists Circular and Chemical Gazette."

was introduced. This development helped in the processing of compounds and reduced costs. Between 1896 and 1900, reclaimed rubber began to be used. With the beginning of the bicycle and automobile industry a large amount of tire and tube scrap became available for eventual use in hard rubber compounds.

In 1912, after the American Hard Rubber Co. had consolidated its position in the industry, steel molds replaced many of the tin and cast iron molds which had been used. In 1920, the industry started experimenting with molded battery containers. At first, these were partly cured in the mold and later completely cured in the mold. In general, the main improvements in hard rubber technology during the past 30 years have been in mold construction and in larger equipment for grinding and mixing operations.

In the 1920's, the use of positive molds was introduced. This eliminated the usual heavy seams and produced an article much closer to finished dimensions. Another development of this period was the lining or covering of tanks, pipes and fittings for the chemical industry. One of the major accomplishments was the manufacture of microporous hard rubber for battery separators requiring new methods not only of compounding but also of calendering and vulcanization.

Some of the more recent developments deal with the determination of the shortest possible cure for a given article, especially heavy articles. This is accomplished through the use of thermocouples. Due to the continuous change in articles manufactured from hard rubber, new combinations of ingredients have been developed through the years to suit the particular demand. Thus, each article can be made with maximum efficiency from a specially developed compound that suits its particular specifications.



Letter from Charles Goodyear to Conrad Poppenhausen, written from London in 1853. Mention is made of hard rubber cane heads and whip handles.

This ornamental plaque, designed as a tribute to Charles Goodyear, was made of hard rubber in 1893.

The history of the American Hard Rubber Co. and the hard rubber industry is a prime example of how ingenuity and inventiveness, combined with good business sense, has produced a multiplicity of necessary and worthwhile products for the benefit of all. Originally, hard rubber was used as a substitute for making products that had been painstakingly made of such substances as tortoise shell, ivory, whalebone, etc. But constant development of compounds and processes has led to a great and ever expanding diversity of end products in new fields. Today, hard rubber is used in thousands of applications, both civil and military.

Personalities

In recounting the history of the American Hard Rubber Co. it is proper to mention those men who by their efforts and wisdom built up the industry. K. Poppenhausen has already been mentioned as the founder of the industry. He was able to associate himself with outstanding practical men, one of them being August D. Schlesinger, a Swiss who came to the United States in 1846 and who worked with Goodyear at Naugatuck until 1847. He was employed by the Beacon Dam Co. in 1856 and when that company was taken over by Mr. Poppenhausen he was transferred to College Point where he remained as general superintendent until his retirement in 1905.

Mr. Fritz Achelis (mentioned earlier) became president of the India Rubber Comb Co. in 1880 and was responsible for the consolidation of that company with the Butler Hard Rubber Co. of Butler, N. J., and the Goodrich Hard Rubber Co. of Akron. The new company, as has been said, was named the American Hard Rubber Co. Under Mr. Achelis' leadership the company prospered and advanced to new heights. Mr. Achelis remained president of the company up to the time of his death, December 23, 1924, when he was in his 81st year.

Another outstanding hard rubber technician was William Kiel, who learned the art of manufacturing hard rubber in Hamburg under L. O. P. Meyer. He came to the United States in 1876 and was named to the Materials Division of the Rubber Comb & Jewelry Co. of Bloomingdale, N. J. He advanced to plant superintendent in 1883, and then general superintendent until his death in 1918.

It is safe to say that the hard rubber industry has been built up by the financiers and merchants, Poppenhausen and Fritz Achelis, and the rubber technicians, L. O. P. Meyer, Schlesinger and Kiel. In 1917, F. G. Achelis, son of Fritz, became general manager of American Hard Rubber. Modern principles of factory management and accounting were introduced and the first chemical laboratory for checking and testing materials was established. This work was accomplished under E. S. Boyer, who was then works manager. Mr. Boyer served as president of the company from 1926 to 1942 when F. D. Hendrickson, formerly vice-president, became president of the company. Mr. Hendrickson is still president of American Hard Rubber.

Other officers of the current company are: Allen H. Ottman, vice-president and controller; Roland Reppert, vice-president in charge of sales; Leslie Weeden, vice-president in charge of manufacturing; Edward W. Kane, treasurer; and Budd E. Pollak, secretary.

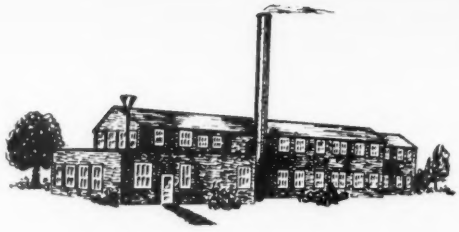
Further History

As the B. F. Goodrich Co. expanded, its buildings eventually surrounded the Akron factory of the American Hard Rubber Co. In 1917, American Hard Rubber sold its plant in Akron to Goodrich, and moved into a new, modern plant on Seiberling Street in the eastern part of the City of Akron.

In 1932, the College Point factory, pioneer workshop of the hard rubber comb industry and of the parent organization, was sold, the facilities being consolidated with the Butler factory. With the plant's closing went part of the lore of an industry covering 78 years of successful development and operation. Age, high taxation rate and poor railroad facilities made the sale advisable.

The passing of the Enterprise Works at College Point marked the end of an era. Of interest are some of the rules and regulations laid down for workers at the old Enterprise Works in 1855 and signed by K. Poppenhausen. A bulletin posted in the plant stated:

This is a view of the first floor at 11 Mercer Street in New York City taken about 1890. The company maintained headquarters at this address for some 80 years.



Sketch of the original plant of the Pequanoc Rubber Co. at Butler, N. J., as it appeared in 1901.

The working hours are from 7 to 12 o'clock A.M., and from 1 to 6 o'clock P.M.

The men are expected to be punctual and diligent, regular in their attendance, and to avoid during the working hours all useless conversing, or anything that may cause delay or disturbance, and to observe a quiet and orderly behavior.

Smoking, Reading or Singing not allowed. All spirituous liquors are strictly prohibited. Whoever should introduce any into the factory will be immediately discharged.

There will be a Foreman for each department, or room, whose duty it will be to preserve order and decorum in his department, and to see that the above Rules are complied with . . . he is expected to be the first in, and the last out of his room, and to act in every respect in the interest of his company.

Each Foreman of a room or a department, will receive a bonus of 50 cts. to $1 a week, which will be paid on the first of May and 1st of November. Neglect of duty forfeits this bonus.

In December, 1941, the Pequanoc Rubber Co. of Butler, N. J., became a wholly-owned subsidiary of the American Hard Rubber Co. For some years American Hard Rubber had owned a substantial interest in Pequanoc which had been founded in 1901 by Joseph F. McLean, who was its president until his death in 1947. And so we find the company today, the business of the parent concern being the manufacture and sale of hard rubber and plastic products, while that of Pequanoc Rubber is the manufacture and sale of reclaimed rubber.

Throughout the years, the American Hard Rubber Co. and its predecessor companies have shown the way to new and greater developments in hard rubber technology. The years have seen many changes in the company and in its products. As a far cry from the original dress stays, the company now furnishes items for atomic energy plants. Instead of hard rubber exclusively, nearly 100 different compounds and plastics materials, including thermoplastics, are now being offered to customers.

The company presently operates two plants, one at Akron and one at Butler, N. J. On October 1, 1951, the firm moved its executive, sales, purchasing and general accounting departments to new, modern offices at 93 Worth Street, New York 13, N. Y. For 80 years previous, the American Hard Rubber Co. and its predecessor, the India Rubber Comb Co., had been located at 11 Mercer Street in downtown Manhattan. Today, the firm also maintains sales offices in Akron and at 208 South La Salle St., Chicago 4, Ill.

In the annals of business, few companies arrive so vigorously at the age of 100 years. With the background of progress and growth, the American Hard Rubber Co. looks forward to its next century of service to the nation.

Selected Rubber References for the Mechanical Engineer—July, 1950 - June, 1951

By R. E. SHRADER and R. M. TURNER

Rubber Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware

THE purpose of this paper is to present an outline of rubber articles published during the past year which would be of interest to mechanical engineers. Those which are believed to be of special interest to the engineer are discussed in some detail, while those dealing with research on elastomers and compounding studies have been purposely omitted. The references have been divided into arbitrary groups in order to present a more interesting discussion.

Few people outside the rubber industry realize either the current growth of the industry or its demand on technical personnel. The rubber industry is big business, and it is getting bigger faster than the general economy of the United States. In 1939, the total consumption of rubber was 860,000 long tons, whereas in 1951 it is expected to exceed 1,700,000 tons. Furthermore, in 1939 only 2% of the rubber used was synthetic, whereas in 1951 approximately 50% of the elastomer requirements are being met with synthetic rubber. The value of the rubber products made in 1951 is expected to exceed 3.5 billion dollars.

Processing and Manufacturing

With the increased use of rubber, there has been an increased interest both in methods of reclaiming rubber and in methods of producing synthetic rubber.

A new mechanical process for obtaining high quality reclaim has been announced *(1)*. It is the Banbury-Lancaster method and is built around a newly designed Banbury rubber reclaimer and devulcanizer. With this apparatus it is reported possible to reclaim completely cured, partially cured or scorched stocks and uncured trimmings either separately or together in one simple operation.

An interesting flow sheet of a rubber reclaiming process was presented in RUBBER AGE *(2)*. Cracking rolls, screens and magnets are used to remove metal parts and reduce the scrap to a $\frac{3}{8}$-inch sheet. Those interested in reclaiming should find this article very useful.

Chubb, Taylor and Feustel have developed a new process of deresinating guayule *(3)*. They expressed the thought that their process would yield a domestic source of rubber should our supply of Hevea be lost.

A method has been announced to produce cellular rubber from latex in which blowing agents and surface active agents are incorporated in the latex and expansion occurs in the mold after heating *(4)*. This method is contrary to the usual practice in which a froth is produced by beating air into heat-sensitized latex and gelling before heating. The new technique is said to produce products having more spherical and regularly disposed openings and a higher density at the surface than in the center.

An interesting article on manufacturing rubber footwear has been published which presents the problems and complexities of this business from the manufacturer's viewpoint *(5)*.

Engineers designing polymerization equipment will find of interest an article by Hobson which discusses the importance of eliminating oxygen from the GR-S polymerization system *(6)*.

Ultrasonic vibration to accelerate polymerization is being tested *(7)* and radio-frequency has shown new merit with respect to vulcanization of rubber *(8)*.

New Applications

Cavitation and erosion has caused such severe pitting and loss of metal on ship appendages that methods of coating these areas are continually being tried *(9)*. During the last war, a technique was developed by the Navy for covering metal with a molten spray of a synthetic rubber. This coating is especially effective in salt water exposure. The equipment used resembles a welding torch into which is fed a powdered form of synthetic rubber. The powder, when contacting the flame, becomes a liquid and it fuses to the steel member being coated. The whole operation is costly because of the careful preparation that must be given the surface, the skilled labor needed to operate the spray gun, and the loss of 40 to 50 percent of the material when it passes through the flame. Recent improvements both in the spray material and the methods of application should widen the utility of this process and make it practical for many industrial uses *(10)*.

Experiments have been successfully carried out with glass fiber reinforcement in foam rubber *(11)*. Bennett, McFadden and Lyman have found that adding glass fibers in the preparation of the foam rubber results in a marked improvement in physical properties. Vulcanized foam rubber which has been reinforced in this manner shows greatly reduced shrinkage during curing and drying, increased resistance to compression and increased tensile strength.

Goodloe reports that wood cellulose as a filler in rubber compositions reduces shrinkage and kills nerve *(12)*. These two properties have frequently restricted the development of elastomeric articles requiring close dimensional tolerance.

The use of phenolics in many products has been limited because of insufficient impact strength. This deficiency can be overcome by the addition of synthetic rubber to the phenolic material. Goss *(13)* reports

Note: This annual report on the rubber literature of special interest to mechanical engineers was presented by Mr. Shrader before the Rubber and Plastics Division, American Society of Mechanical Engineers, Atlantic City, N. J., November 27, 1951.

some of the physical characteristics of rubber-phenolic mixtures and indicates some of the possible applications of such combinations.

The use of rubber powder in paving highways is increasing, and experimentation is continuing *(11-17)*. Gunther *(14)* has found that a tire tread type compound in the form of a fine powder when added in the amount of 10% produces the most satisfactory paving.

A new type spray gun has been announced which is said to spray polymeric emulsions without the usual clogging and cobwebbing *(18)*. This spray gun ejects water vapor, air and the emulsion simultaneously out of three different nozzles and Nelson and Leonard believe it will be of great help in the spraying field.

Equipment

The advances made in equipment are, as would be expected, not so numerous as those in the fields of research and application. There have been several articles published, however, in relation to plant design and equipment which should be of interest to the engineer.

There are, no doubt, many instances where the designer of a small plant cannot afford to spend the necessary time in making an accurate cost study before selecting his power distribution system. An article has been presented in which an engineering study was made of the power distribution system in a small rubber plant. This study indicates that the selection of the proper voltage is an essential step in achieving a low-cost flexible system *(19)*.

One of the most important steps in the processing of rubber articles is that of vulcanization. Temperature, pressure and time must be all carefully controlled to achieve the maximum efficiency in this process. Industrial controllers are contributing in a large measure toward maintaining these variables within the required limits *(20, 21)*. Types and sizes of hydraulic presses used in the vulcanization process have been reviewed *(22)*. These presses have capacities as high as 5,000 tons. Work has been done showing that it is possible to construct molds having suitable electrical insulation for radio-frequency heating *(8)*.

From a safety standpoint, much of the equipment used in the rubber industry, such as open-roll mills, calenders, crackers, and refiners, presents serious operating hazards. Although this subject is not new, there has recently been renewed interest in the safety codes of rubber equipment, and an interesting article has been presented on the instantaneous braking of such equipment *(23)*.

The design engineer, who has frequently requested fundamental physical properties of rubber parts under high speed service conditions, will be interested in a new high speed tensile testing machine *(24)*. This machine is capable of recording the stress-strain curve of rubber at rates of elongation 9,000 times as fast as that employed in conventional rubber testing.

The elastic properties of polymers and plasticized rubber compounds, which are too soft to test on a conventional stress-strain machine, have now been measured by a constant stress method of elongation *(25)*. The constant stress is obtained by employing a specially designed tension weight suspended from the specimen. As the film stretches, the weight is lowered into a liquid and buoyancy reduces the load in proportion to the decrease in cross-sectional area of the test specimen. The change in strain with time is measured. This method is reported to be particularly useful for characterizing unvulcanized polymers and for evaluating plasticizers in uncured compounds.

Better correlation between a laboratory test and tire performance than previously possible with conventional methods of testing has been reported *(26)*. This laboratory test, performed on an inclined plane tester, subjects the rubber specimens to low tensile stresses and is rapid and reproducible.

Hysteresis measurements over a wide range of elongations and amplitudes have been reported by Mooney and Black. These measurements have been made with a spider hysterometer *(27)*.

Testing and Properties

In the field of testing, it is recognized that the desirable end result is to develop a test that will give a true indication of service life. It is with this thought in mind that testing as such must be viewed very critically to be sure that the test reflects service conditions.

Winkelmann states that the weather resistance of elastomeric vulcanizates is influenced markedly by their treatment prior to vulcanization *(28)*. He has observed that strains not released before or during vulcanization result in poor weather resistance. Extruded stocks show less checking or cracking than molded articles.

Wahl reviews the various types of abrasion testers and points out the importance of selecting the one which most nearly approaches the service application *(29)*.

The mechanism of flex cracking is not clearly understood, and yet it is the cause of failure of many rubber articles. Buist and Williams discuss the flexing testers now in use in the rubber industry and briefly review all the work that has been done on this subject. They point out the gaps in this field and cite the need for additional work *(30)*.

The development of methods of evaluating tear resistance is still an active problem in the rubber industry. ASTM, in 1948, adopted the angle tear specimen (Graves) as an alternate to the crescent specimen which has been used for a number of years to evaluate tear resistance of rubber. The fundamental difference is that the Graves specimen measures the force required to initiate tear, and the crescent specimen measures the force required to continue tear. There is still considerable controversy between advocates of these two methods of evaluating tear resistance *(31)*.

The tests required on many rubber mountings are of a load deflection type. If the load on a rubber product is maintained, deflection will increase with time and the extent of this deflection is known as creep or drift. Cooper presents formulas and graphs, which are of value to design engineers, for predicting this property of a rubber product *(32)*.

Enabnit and Gehman have found that by the use of certain types of tests the dynamic properties of a vulcanized compound can be fairly well anticipated in the raw polymers *(33)*. These properties can be measured by using low amplitude shear vibrations at 60 cycles per second so that effects due to plastic flow in the raw polymers are suppressed and the values of dynamic modulus and resilience are independent of plasticity.

It has been reported that there is still no satisfactory and discriminating test available for evaluating rubber-to-metal bonding agents. Buist has presented data in the past year which show the importance of the volume of rubber rather than the shape factor in a test unit *(34)*. This work should lead to a better method of testing of rubber-to-metal bonding agents, since it offers a clearer picture of the facts underlying the design of rubber-metal spring units.

The application engineer will be interested to know that an accelerated aging test has shown excellent cor-

relation with service performance on neoprene-jacketed cables *(35)*. Vacca's performance test covers a period of 9 years and, as a result of the excellent correlation with accelerated aging tests, it is apparent that the service life of more than 20 years can confidently be expected from these neoprene-jacketed cables.

Because of the increased demand for rubber compounds to function at extreme low temperatures, the importance of low temperature testing has increased. Those interested in low temperature testing will find "Low Temperature Testing of Elastomers" well worth reading *(36)*. It defines and discusses crystallization, plasticizer-time effects, and second order transition.

Shaw states that some rubber procurement specifications are inadequate in specifying the proper test methods for obtaining articles that will operate satisfactorily under arctic conditions. This article recommends test methods for specific applications and classifies them according to the physical properties they measure *(37)*.

Riesing presents a very interesting review of engineering design with rubber and a description of fifteen important elastic polymers. Temperature and hysteresis effects in all types are shown and methods of calculating designs of special shapes are furnished *(38)*.

Van Rossem presents a review of natural rubber and its properties as a raw material for the manufacturing industry. He discusses general requirements for rubber manufacturers, possible new methods of preparation, and the future of natural rubber *(39)*.

Liska states that skilled rubber technologists are in a very favorable position today to assist the engineer in selecting rubber materials for specific applications. Of course, final acceptance of a product must be based on service testing. A review of six automotive rubber products and how the rubber technologist might approach them are outlined in the paper, which also includes a chart of the basic qualities of natural and certain synthetic rubbers *(40)*.

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Editorials . . . . . .

Season's Greetings

ONE of the remaining pleasures in this disturbed world is the opportunity of putting aside the routine of daily living and the grind of business chores to wish our readers a Merry Christmas and a truly Happy New Year.

THE PUBLISHERS

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Relaxed Restrictions

ANNOUNCEMENT by the NPA Rubber Division that restrictions on the consumption of total new rubber will be largely eliminated after January 1 came as no surprise to the industry. The steadily mounting production of GR-S, despite occasional set-backs, was a guarantee of the fact that removal of allocation control of that general purpose synthetic was merely a question of time. Although monthly production has not yet achieved the 760,000 long ton-a-year rate scheduled earlier this year, it is very close to that figure and, barring unforeseen difficulties, the now-scheduled rate of 860,000 tons-a-year should be reached by mid-1952.

As expected, the NPA announcement indicated the government's desire to withdraw from the exclusive purchasing of natural rubber latex, and a specific order covering such withdrawal will probably be issued within the next few weeks. The only major hitch remaining on this score is the necessity of liquidating government-held latex stocks at the 64 cents-a-pound price. It had been hoped that the government would also announce its withdrawal from the exclusive importation of dry natural rubber but reports from Washington in recent weeks threw cold water on such hopes and so while the failure to take action on this point was disappointing it was not unexpected.

As far as can be determined at the moment, the government will continue to function as exclusive importer of dry natural rubber at least through the first quarter of 1952 and, accordingly, as emphasized in the announcement referred to above, the specification controls on natural rubber, contained in Appendix A of NPA Order M-2, will be continued with a few minor modifications. These modifications, some of which will actually reduce the amount of natural rubber permitted in some products, particularly tires, will be designed to insure that the rate of consumption of natural rubber will be kept within a 105,000-ton limit per quarter.

There were two basic reasons for the decision to continue control over the importation and use of dry natural rubber. The importation angle is of course tied in directly with the strategic stockpile and while the size of that stockpile is apparently close to the unnamed goal, it has not quite reached satisfactory proportions. The General Services Administration, charged with purchasing activities, has not been able to maintain its speeded up post-Korea stockpiling pace because prices in the Far East for several months have exceeded that agency's buying ideas. The decision to continue consumption control was based on a questionnaire recently sent to all rubber consumers asking them to list their total requirements for the first quarter of 1952, both natural and synthetic. This survey indicated that the industry wanted more natural rubber for that period than would be available for consumption.

The official NPA announcement also contained a statement indicative of the fact that the rubber manufacturing industry is probably in for another boom year in 1952. It was reported that certificates of necessity for rapid tax amortization had been filed with the NPA Rubber Division for plant expansions involving a proposed expenditure of $100,000,000. Early application for at least $33,000,000 worth of plant expansion for rapid tax write-off will be made to the Defense Production Administration. It will take a lot of rubber fuel to stoke these new expansions.

The firm grip held by Butyl rubber in the domestic rubber manufacturing field was also indicated in the announcement. No changes are contemplated in the parts of Order M-2 affecting the manufacture of passenger tire tubes which now must be made of Butyl unless it is not available, in which case natural rubber may be used. On this score it is interesting to note that at a recent meeting of the NPA Rubber Industry Advisory Committee the committee recommended that prompt legislation be passed to provide funds for the expanded production of Butyl rubber. Some members of the committee registered objection to this proposal on the ground that they were opposed to any further building of synthetic rubber plants by the government.

To sum up, the forthcoming modification of NPA Order M-2 is in line with about what the industry expected it to be. The major disappointment is continued control over importation and consumption of natural rubber, but hope is maintained that an end to such control is in the offing.

NEWS OF THE MONTH

NPA ANNOUNCES PLANS TO RELAX CONTROLS IN JANUARY 1 REVISION OF NPA ORDER M-2

IN an announcement on December 4, the government outlined plans for a sweeping relaxation in its restrictions on consumption of rubber in the United States. The new regulations governing rubber consumption will be established in a revision of NPA Order M-2, effective January 1, 1952. As of that date, NPA said, all rubber users will be free to produce just as many tires, tubes and other rubber products as they want, so long as they are produced according to NPA specifications on the proportion of natural and synthetic rubber used. At present, manufacturers of replacement tires and tubes, garden hose and many other civilian products can turn out only 90% of their base period production, while all other users are limited to 100% of base period production. These limitations will be removed completely on January 1, NPA said. Allocation of GR-S will also be eliminated at that time, according to the government agency.

NPA did say, however, it will require makers of all types of passenger and truck tires to use slightly more synthetic rubber in their tires. Allocation of Butyl and other special synthetic rubbers will continue in effect, and the present 30-day inventory limitation will also remain in effect for all types of synthetic rubber.

The government agency said the relaxation of controls on synthetic rubber was made possible by a sharp increase in U. S. stocks of synthetic. At the end of the first quarter of 1951, stocks of synthetic rubber held by industry and the Reconstruction Finance Corp. amounted to about 45,000 long tons. This will have risen to nearly 100,000 tons by the end of the year, the agency estimated. Synthetic production is currently running at high rates, and the government only recently announced there would be enough next year (1952) to allow for some exporting of synthetic. According to the NPA announcement, the forthcoming order will do the following things:

Features of the Order

(1) It will wipe out all present restrictions on total use of rubber for individual products. At present, items listed on Appendix B to NPA Order M-2 are restricted to 90% of the rubber used in the average of the four quarters ending June 30, 1950. These items include replacement tires and tubes, garden hose, billiard and pool table cushions, bowling balls, bathing caps, balloons, sponge rubber products, toys and teething rings.

All items not listed in Appendix B are limited to 100% of the base period use. These products include hose, belting, new car tires, aircraft equipment and other industrial rubber products. Both the 90% and the 100% restrictions will be removed in the new order, and manufacturers of all rubber products will be able to use practically all the rubber they can buy, provided each item produced has no more natural rubber in it than allowed under other provisions of the rubber order.

(2) Increased use of synthetic and decreased use of natural rubber will be required for production of automobile and truck tires. Small passenger car tires will be able to use no more than 14% natural rubber, compared to the present 15%. Large passenger car tires will be cut from 22 to 20% in natural rubber content. The percentage of natural rubber in truck tires will be cut 2 to 5 percentage points, depending on the size of the tire.

(3) There will be no relaxation of the present ban on white sidewall tires. NPA explained that these tires require a high grade of natural rubber and titanium dioxide, both of which are in short supply.

(4) The government no longer would allocate GR-S, according to the expected order, and users will be free to buy all they want from the RFC so long as they buy for their own consumption or have validated export licenses from the Department of Commerce. Butyl and other special purpose synthetics will continue under government allocation. Buyers of general purpose synthetic would, however, be prohibited from getting more than 46% of their purchases of synthetic in the form of "cold rubber."

(5) NPA reiterated that the authority to purchase natural rubber latex would be turned back from the government to private industry "in the near future"—as soon as government stocks are bought up by the industry.

(6) NPA said it would try to hold the consumption of natural rubber down to 105,000 long tons a quarter. The third quarter rate this year allowed by NPA was 99,600 tons, and the fourth quarter rate is expected to be right at the 105,000 figure. The reduction in the percentage of natural rubber which can be used in tires would presumably offset any increase in the use of natural rubber which might result from the removal of the restrictions on the total number of rubber products which can be produced. "Consumption of natural rubber must be kept within the 105,000 ton limit or it may become necessary to re-impose controls on the use of dry, natural rubber," NPA warned.

Data on Latex Situation

The advice that the government was getting out of the natural latex business, as noted above, was initially announced on November 19 by the General Services Administration. Jess Larson, Administrator, said at that time that no specific date for surrendering buying authority over latex could be set "because turning the purchasing power back to industry involves an orderly liquidation of present stocks to protect the taxpayers' investment."

Mr. Larson said that the liquidation will take an indeterminate time because, since latex is not under allocation, GSA has no knowledge of what industry may or may not buy of its stocks in the next month or so. Under current arrangements, industry desiring latex has placed its orders with GSA, which has operated exclusively in the world market for stockpile and American industrial account.

Mr. Larson said the change-over arrangement is being carried out "with the full advice and consent of the importing industry representing the major producers and consumers of latex. As soon as the industry takes out of our hands government-held stocks we will get out of the latex business." Mr. Larson said that continued exclusive purchase by GSA of other grades of natural rubber must continue.

"I repeat my earlier statements that we will get out of the rubber business as soon as we can," he said. "I also repeat that the time is in the foreseeable future. With respect to latex it is here, except for working out the final arrangements. With respect to other grades of crude, the time is not yet here, but we are as anxious for it to arrive as anyone else."

Reaction to NPA Statement

First trade reactions to the NPA announcement opined that car owners will find less expensive grades of tires again on the market in 1952. Consumer savings of as much as $5 to $8 per tire may be possible when manufacturers begin processing second-line tires, it was said.

At the present time, the rubber industry can make only one line of tires and manufacturers have concentrated their production on first-line, premium grade tires. Industry sources expect that manufacturers will begin producing second-line tires as soon as they are permitted because the tire business is said to have been lagging for months.

Many motorists have been passing up the more expensive first-line tires because they have been able to have their worn tires recapped at a considerable saving. With less expensive new tires again available, replacement tire sales are expected to show more activity.

The supply of tires for replacement purposes should increase, according to James L. Newman, vice-president of the B. F. Goodrich Co. Mr. Newman said elimination of restrictions on the use of synthetic rubber should make it possible for manufacturers to produce at least 71,000,000 passenger car tires in 1952, a 5,000,000 unit increase over the estimated output in 1951.

News of the relaxation of the NPA rubber order has, at this writing, had little effect on the price of natural rubber in the primary markets. Some trade sources anticipated that unlimited use of synthetic rubber by American consumers might have a depressing effect on Far Eastern natural rubber sellers, but prices on the Singapore market, for example, were steadier.

News of Synthetic Rubber

Of primary interest in the synthetic rubber field was the appointment of Leland F. Spencer as chief of the Synthetic Rubber Division of the Reconstruction Finance Corp. Mr. Spencer assumed his new duties as of the date of the announcement, November 26. Previously, he had served as director of the Rubber Division of the National Production Authority.

Mr. Spencer is on leave from the Kelly-Springfield Tire Co., where he is a vice-president. As chief of the Synthetic Rubber Division, he will have charge of production in all government rubber plants.

E. D. Kelly, formerly deputy director of the NPA Rubber Division, was named to succeed Mr. Spencer as director. E. A. Harris, formerly special assistant to the rubber director, was named deputy director.

RFC has also announced the development of a new type of oil-extended rubber which has definite commercial possibilities in the manufacture of tires. The new rubber is a high-viscosity oil extended butadiene-styrene polymer in which the oil is incorporated with the monomers during polymerization in a non-aqueous solvent (such as pentane) in the presence of alfin catalysts. These catalysts are complex organo-sodium compounds such as sodium alkoxide-sodium olefin mixtures and were developed by A. A. Morton of the Massachusetts Institute of Technology in research sponsored by RFC.

The new rubber was developed by J. D. D'Ianni, Goodyear Tire & Rubber Co., and W. K. Taft, Government Laboratories, University of Akron, and their associates in an RFC-sponsored project.

The addition of rubber processing oils to high molecular weight GR-S rubber, both hot and cold types, has been found to be an effective way to extend the supplies of synthetic rubber. Commercial production of oil-extended rubber got under way in government-owned plants in March, 1951. Production rates have been boosted as rapidly as possible, and at present the rate is approximately 12 million pounds a month, with over 50 million pounds produced to date.

High viscosity rubbers have many desirable qualities for use in tires, but the processing of these rubbers in tire factories has presented practical difficulties. One advantage of the oil extension method is that it overcomes some of these processing difficulties. In the manufacture of the usual GR-S oil-extended rubber, for example, the oil is added to a latex of high viscosity GR-S which has been polymerized in aqueous solution. In the production of normal viscosity GR-S, a certain amount of mercaptan modifier is used to maintain the molecular weight at a processable low value. With oil-extended GR-S, less modifier is used and the added oil serves to replace the amount of modifier withheld.

Alfin polymers have the advantage of polymerizing at a rapid rate, yielding a high viscosity, gel-free rubber. The disadvantage has been that there are no effective modifiers to control the molecular weight to the point where the product could be processed satisfactorily in a tire factory. The addition of oil overcomes the need for modifiers.

Studies to date on alfin polymers have included addition of oil to the isolated polymer, to the polymer swollen with solvent before removal from the reaction mixture, and to the reaction mixture before polymerization. The last method presents commercial possibilities since the catalyst may be added directly to a solution of the monomers in oil. In this technique the oil replaces part or all of the non-aqueous solvent.

Several steps are necessary before these oil-extended alfin polymers can be considered for commercial development. The first of these is the preparation of sufficient rubber to make tires for road tests. A second problem will be extensive pilot plant studies to develop a satisfactory commercial method. Since the preparation of alfin catalysts requires care, considerable additional work will be required to develop a safe and efficient process for the manufacture of the catalysts on a large scale.

RFC has also disclosed that Goodyear is experimenting with commercial production of a new type of synthetic rubber made from vinyl toluene which is used as a substitute for styrene. Vinyl toluene was developed by the Dow Chemical Co. which expects to start large-scale production of the chemical by the end of 1952. At present, it is being produced only on a pilot plant basis.

RFC said the process was developed by Goodyear in cooperation with the Synthetic Rubber Division of the government agency. Government fleet tests have indicated that normal road wear performance results with tires made from the new synthetic.

In the new process, butadiene is combined with vinyl toluene instead of styrene. Styrene is also a raw material for the production of plastics and is usually in heavy demand for this purpose. Dow officials have stated that the development of vinyl toluene started during World War II as an answer to shortages of essential synthetic rubber producing materials.

Synthetic For Export

In line with the previously mentioned availability of synthetic rubber for export in 1952, RFC has forecast a good increase in the output of synthetic during the next few months with production, now in excess of 750,000 tons a year, reaching 850,000 tons by the first quarter of 1952. With that increase in prospect, the Office of International Trade of the Department of Commerce recently notified the rubber industry that it will begin clearing "limited quantities" for use abroad in the first quarter of 1952.

The announcement did not give any figures, but it warned foreign countries not to expect to get all they might like. OIT stated that exports would permit sustained production of GR-S in the United States and would lessen the drain on stocks of natural rubber in friendly areas. This suggested that the RFC might actually need an export market to sell all the output. The rubber sold by RFC will be at the same price domestic consumers pay, 26c a pound.

Other news of interest in the synthetic field came from Akron, where the synthetic rubber pilot plant of the Firestone Tire & Rubber Co. was hit by fire on November 25, causing an estimated $200,000 in damages. City firemen and the company's own fire-fighting crew battled the blaze which nearly engulfed the nearby reclaimed rubber plant. Firestone officials said the fire broke out in the reactor area of the pilot plant in a tank of the chemical used in the manufacture of synthetic. There was an explosion and the fire spread to the rest of the area. A favorable wind and a fire wall separating the pilot plant from

Third Annual Rubber Report

As this issue went to press, the Secretary of Commerce made available the "Third Annual Report on Rubber," covering the period July 1, 1950, to June 30, 1951. Under the Rubber Act of 1948, an annual report to the president by the Secretary is required. The Rubber Act, as extended June 30, 1950, contained no substantial change. The third report covers general developments in the rubber program, and the operations of the Department of Commerce in this regard. Copies may be secured from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at a cost of 20c each.

the rest of the buildings helped prevent a more severe loss.

W. Stuart Symington, RFC Administrator, has announced that the synthetic rubber program has on hand and under commitment more than 100,000,000 gallons of alcohol for the production of alcohol-butadiene used in the making of GR-S. This supply is sufficient to meet the alcohol requirements of the synthetic rubber program for the remainder of 1951 and for several months of 1952.

For this reason, RFC, at present, is making no further purchases or commitments for alcohol for the synthetic rubber program. Mr. Symington also disclosed that despite the bad fire at the Borger, Texas, butadiene plant in September, GR-S production for November was back on schedule at the 760,000 ton per annum projected rate.

December production will be somewhat above this rate, reflecting the first increase as a result of the program of expanding production aimed at an annual rate of 860,000 tons by mid-1952.

Launches Alteration Program

Kentucky Synthetic Rubber Corp. has launched a $1,300,000 alteration program at its plant in Louisville, Ky., to change the plant from standard to cold GR-S. Henry F. Palmer, general manager, said the work is to be completed by July, 1952. The plant is one of 13 presently operating under RFC. In October, the plant produced 3,300 long tons, 300 more than its World War II peak. Its present capacity is 3,800 tons a month, but a shortage of butadiene is holding down production.

It was also reported that ten rubber footwear manufacturers are being admitted into partnership in Kentucky Synthetic Rubber. It was further reported that the ten, as a group, will be represented by Chas. H. Baker of the Goodyear Footwear Corp., Providence, R. I.

Reports from Washington, D. C., state that the government is considering the construction of several new synthetic rubber plants in the Southwest, with Texas the most logical location. It is likely that if the new plants are decided upon, they will be constructed with government funds and operated under RFC.

Government Committee News

Senator Guy Gillette (Iowa, Dem.), chairman of the Subcommittee on Rubber of the Senate Select Committee on Small Business, has stated that the special "watchdog" committee representing smaller rubber manufacturers will continue to keep an eye on government rubber activities. Recent events which led to the resignation of Charles Shaver, counsel for the Senate subcommittee, had brought trade reports that this meant the end of the activity of both the Senate group and its "watchdog" committee.

Mr. Shaver resigned suddenly after his name had come up in connection with the use of alleged "influence" on former RFC officials on behalf of loan applications. In his official capacity, Mr. Shaver had directed most of the investigations against the big rubber firms early last Spring. It was also reported that at the same time a group of small companies had retained the Washington law firm with which Mr. Shaver was associated to represent them at rubber hearings conducted by the Senate subcommittee.

The Rubber Subcommittee, in May of this year, held up its proceedings because RFC had just changed top leadership. Mr. Shaver and the subcommittee members wanted to give the new group time to become adjusted to their new positions. At hearings which began in March and lasted through May, Mr. Shaver had tried to show that the larger firms were using all available rubber at the expense of the smaller firms.

Akron rubber executives vigorously denied the claim, and showed plant production schedules which had been cut for lack of rubber, rubber workers out of work and an unhealthy situation all around. The rubber hearings never were concluded. Subsequent rulings by NPA, however, provided more rubber for all segments of the industry.

In a story which first appeared in the *New York Herald Tribune* on November 8, it was said that Mr. Shaver, while acting as subcommittee counsel, had energetically intervened with the RFC in recent months on behalf of at least one of the small rubber companies represented on the "watchdog" committee whose head had set up the "pool" arrangement to retain the firm with which Mr. Shaver was associated.

Mr. Shaver said that he never received any of the fees paid to the law firm, although he was listed on the company's letterhead as an "associate." He said he kept the listing that way so that his membership in professional organizations would not lapse while he worked for the Senate subcommittee.

Recent Pricing Announcements

On November 9, 1951, the Office of Price Stabilization issued Amendment 33 to Ceiling Price Regulation 22, making mandatory, effective December 19, 1951, adherence to CPR 22 (or other regulations stated therein). Those manufacturers electing to file under the so-called Capehart Amendment, Supplementary Regulation 17, which was issued simultaneously with Amendment 33, must first file Form 8 under CPR 22. Compliance with CPR 22 which was first promulgated in April, 1951, has been voluntary in the intervening times.

Subsequently, on November 29, OPS announced a simplified method which certain small manufacturers and sellers of industrial services may use in making the so-called "Capehart adjustments" in their ceilings. The action, taken in General Overriding Regulation 20, is of particular benefit to small firms who do not keep detailed accounting records. The new regulation authorizes these firms to calculate an adjustment for each of the commodities they sell of their over-all business operation.

Of primary interest to the rubber industry is that during the past month the OPS Subcommittee on Original Tire Equipment discussed the desirability of changing ceiling prices to reflect the small voluntary reduction made about October 1. Since this reduction partially reflected the expected reduction in the price of natural rubber for the fourth quarter, but which was not forthcoming on October 1, it was decided that, for the time being at least, ceiling prices on original equipment tires would remain in line with the original freeze on prices as covered by GCPR.

Thus, there have been no changes in tire pricing, although OPS is making an extensive study of retail pricing of tires in the replacement market, with the expectation of preparing a tailored regulation covering tire dealer pricing practices.

Appendix A of CPR 22 permanently exempts metallic oxides, such as zinc oxide, iron oxide, etc. These materials are priced under the original GCPR effective January 26, 1951. The only exception was titanium dioxide which has been placed under CPR 22. All accelerators, antioxidants, and other rubber chemicals are covered by CPR 22.

Application of CPR 22

CPR 22 applies to rubber products other than tires. To date few rubber manufacturers have taken advantage of the additional issue of CPR 22 to GCPR, although such now becomes mandatory on December 19 through Amendment 33. Supplementary Regulation 8 with its Amendments 1, 2 and 3, covers practically all standard rubber pricing practices. Non-standard rubber product prices are covered directly by CPR 22 with the exception that molded, extruded, and cut goods are governed by Supplementary Regulation 10.

SR 18 to CPR 22 was issued November 26 and offers a separate pricing method for small manufacturers whose net sales of goods that they make do not exceed $1,000,000. Since all manufacturers in the rubber industry are affected by the above noted regulations, it would be advisable for each to obtain copies and be guided accordingly.

The OPS Plastic Products Industry Advisory Committee asked that their industry be decontrolled at their fourth meeting held in Washington on November 27, stating that there was no need for further control. Some members expressed resentment at proposals to continue price controls and several charged that OPS had singled out the plastic manufacturing industry as a particular target in this connection.

OPS States Viewpoint

OPS in reply stated that it had attempted to give the plastics industry the same treatment as other industries, and it had no intention of putting free enterprise in a strait-jacket. It suggested the optional use of SR 17 for custom molded products since there appeared to be agreement that proprietary products regularly produced could be handled under CPR 22.

On December 4, plasticizer producers asked OPS for a tailored regulation covering di-octyl phthalate-type plasticizers and spelling out dollars-and-cents ceilings on standard items. At an Industry

Advisory Committee session with OPS officials, the group said new ceilings should be established on the basis of weighted averages of ceilings set up under CPR 22. They also discussed an alternative method of developing industry-wide percentage cost adjustment factors applicable to prices established under GCPR. Producers said part of the industry is still selling under GCPR, which does not reflect increases in raw material costs.

Other News of Interest

The Defense Transport Administration recently announced that barring damage to synthetic rubber and tire producing plants, tires will be only a small factor in limits on the use of automobiles in the event of another war. DTA has been reporting results of a survey of automotive transport problems in time of mobilization as well as war.

The report reviewed the severe tire shortages of World War II, and stated: "The fact that we are no longer dependent on shipments of natural rubber to supply these (tire) needs, leads to the conclusion that the tire problem would not be the limiting factor on automotive use, unless damage to synthetic plants or tire production facilities resulted in unexpected difficulties."

Tire requirements have gone up rapidly as the number of cars has increased since the end of the war, the statement said. But, it pointed out, "demand for tires in a period of rationed travel comparable to that of World War II would reduce these needs to far below the 1950 level. The 1950 level was put at 84,000,000 tires including 37,000,000 for new cars and 47,000,000 replacements.

The report stated that if 40,000,000 cars were permitted to drive about the same mileage as the 25,000,000 kept in operation during the last war, average annual tire replacements of some kind would total about 32,000,000 units. During the war years, according to the study, motorists bought 56,000,000 new tires and 17,000,000 new tubes. These were supplemented by 17,000,000 used tires which were purchased by the government and 6,900,000 recaps.

In the five years before World War II, demand ranged each year between 37,000,000 and 54,000,000, with the average at about 47,000,000 new tires, the report said. During 1942, this figure fell to 3,600,000 because of the start of the tire rationing program.

"Anti-Hoarding" Additions

Other news coming from Washington, D. C., indicated that NPA had added 96 chemicals, metals, and other materials and products to its "anti-hoarding" list of goods. The action was said by NPA to be the first step in reducing to "reasonable levels" manufacturers' inventories of these materials. However, NPA removed some chemicals from its list because they are now in plentiful supply. Among these were titanium pigments. Among the chemicals added to the list were resorcinol, sulfur and Thiokol polymers.

NPA has also announced that production of carbon bisulfide in 1952 is expected to be 51,000,000 pounds short of the estimated requirements. NPA officials discussed with the Carbon Bisulfide Industry Advisory Committee a proposed DPA program to conserve sulfur by limiting the amount of that material which may be used for the production of sulfuric acid and carbon bisulfide. To make up the expected deficit in sulfur supplies, the committee suggested that NPA investigate the possibility of conserving sulfur through greater use of spent acid (diluted sulfuric acid) and the possibility of reducing the amount of sulfuric acid available to industries other than in the rayon and cellophane industries.

Vopcolene Plasticizer 50

Vopcolene Division of the Vegetable Oil Products Co., Inc., Los Angeles, Calif., has announced the development and availability of Vopcolene Plasticizer 50, a secondary plasticizer for vinyl resins designed for use in combination with solvent type plasticizers in order to impart superior low temperature behavior. The company states that it is not necessary to use only the monomeric type of primary plasticizer; polymeric types of plasticizers, such as polyesters, will work equally well with Vopcolene Plasticizer 50. The use of this secondary plasticizer with most solvent types of primary plasticizers will tend to give properties quite similar to the primary plasticizer. Readily available for bulk shipment, one gallon of Vopcolene Plasticizer 50 equals 7.5 pounds.

Acquires Mead Aviation Stock

Thermoid Co., Trenton, N. J., has acquired all the outstanding stock of the Mead Aviation Equipment Co., also of Trenton, which manufactures safety belts and parachutes for the Air Force. The purchase price was not disclosed. Mead Aviation sales for the first ten months of this year amounted to approximately $2,000,000. The company has a $2,400,000 backlog.

RUBBER PRODUCERS IN GERMANY INCREASE 1950 RUBBER EXPORTS

Satisfactory business conditions to which the expansion of export sales made an important contribution were reported at the recent annual meetings of two German rubber companies, the Phoenix A.-G. of Hamburg-Harburg and the Metzeler Gummiwerke A.-G. of Munich.

Although the sharp rise of rubber prices during the 1950 business year occasioned considerable tensions and made price increases inevitable, the two companies were able to secure sufficient raw materials and to maintain and expand the production and sales volume. Dividend payments of 6 per cent on the share capital will be made by both companies.

The Phoenix Co. increased its payroll by 20 per cent to 5,600 persons during 1950. The value of its export shipments during that year was 12 times as high as in the preceding year.

During the current year, it was stated, it has been possible so far to maintain the progress made last year despite the many uncertainties caused by the shortage of coal and import restrictions. The company's Director-General, Otto Friedrich, who during the past few months had acted as the Federal Government's Raw Materials Advisor, recently resumed his work with Phoenix, although he will continue as a consultant to the Bonn authorities.

The Munich company also reported success in overcoming all difficulties which presented themselves last year. Thanks to the rising demand, it was possible to increase the volume of production by 11 per cent over 1949. Special efforts were made to step up sales abroad, with the result that the export turnover was twice and a half as high as the year before.

Exports have continued to develop favorably during the current year, the annual meeting was told. Foreign sales in the first seven months of 1951 were 20 per cent above those for all of 1950.

The company's domestic business also progressed satisfactorily in the first half of this year. Although there has been some decline in the more recent months, it can be assumed that the final results for this year will be favorable.

DPA Sets Steel Allotments

The Defense Production Administration, on November 13, announced that allotments of structural steel for the first quarter of 1952 will be substantially the same as they were during the fourth quarter of 1951. Under the first quarter allotments, the Rubber Division of NPA requested 175 tons of structural steel which was granted.

Thiokol Grants Stock Rights

Directors of the Thiokol Corp., Trenton, N. J., have granted subscription rights to shareholders for the purchase of additional shares of capital stock at $9 a share. Proceeds will be used to provide additional working capital for expanding production and increasing plant facilities. Rights will be issued on the basis of one new share for each thirteen shares held.

AKRON RUBBER GROUP HEARS ADDRESS BY LELAND SPENCER

The October 19th meeting of the Akron Rubber Group held at the Mayflower Hotel in Akron, Ohio, heard an address by Leland E. Spencer, director of the Rubber Division of the National Production Authority. Mr. Spencer spoke to more than 500 members and guests, the largest fall meeting in the history of the organization. In his address the speaker stated that the United States is going to keep the brakes on rubber usage until the nation's "complete security in rubber is assured."

According to Mr. Spencer, the rubber industry has come out of a year of defense mobilization probably hurt less than any other major industry. Mr. Spencer did not predict, however, when restrictions on rubber would be lifted. Defense orders, he said, have been and will be met in full and on schedule. Substantial quantities of rubber have and are being added to the stockpile.

Mr. Spencer noted that synthetic production has reached its demonstrated capacity and operating inventories of synthetic all along the line have been rebuilt. Essential defense-supporting and civilian requirements have not suffered. Labor dislocations have been negligible, he added.

The speaker pointed out that the current production rate of the tire industry is near an all-time peak. Truck tires are being made at a rate of 20,000,000 annually, passenger tires at a rate of 70,000,000 annually, and farm tires at a rate of 5,000,000 a year.

World output of new rubber, both natural and synthetic, was up 28% in the first seven months of this year, the speaker said, while consumption increased only 10%. Therefore, new rubber is being made available for stockpiling at the rate of 350,000 tons a year.

Mr. Spencer further stated that inventories of finished goods are dangerously low and that these must be rebuilt as soon as possible. He also noted that tremendous strides have been made and are being made in research and development of synthetic rubber. These advances, he added, greatly reduce our dependence on natural rubber.

Following Mr. Spencer's talk, motion pictures of the recent professional football game between the Cleveland Browns and the Los Angeles Rams were shown.

Dale F. Behney (Harwick Standard), chairman of the group, named the following members to the Nominating Committee for officers of the forthcoming season: E. L. Stangor (DuPont), chairman, and C. A. Ritchie (Goodrich) and Henry F. Palmer (Kentucky Synthetic Rubber).

1951-52 CEC Catalog Available

Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y., has issued the 36th Annual Edition of the Chemical Engineering Catalog. In 1717 pages, the catalog presents up-to-date data on equipment, engineering services and materials of construction provided by 482 leading manufacturers. A new improved classified index makes detailed data quickly and easily accessible.

Coming Events

Dec. 20. Elastomer and Plastics Group, Northeastern Section, A. C. S., Room 6-120, M. I. T., Cambridge, Mass.

Jan. 16. Washington Rubber Group, Washington, D. C.

Jan. 17. Elastomer and Plastics Group, Northeastern Section, A.C.S., M.I.T., Cambridge, Mass.

Feb. 1, 1952. Akron Rubber Group, Winter Meeting, Mayflower Hotel, Akron, Ohio.

Mar. 3-7, 1952. A.S.T.M., Spring Meeting and Committee Week, Hotel Statler, Cleveland, Ohio.

Apr. 4, 1952. Akron Rubber Group, Spring Meeting, Mayflower Hotel, Akron, Ohio.

Apr. 17. Rhode Island Rubber Club, Metacomet Golf Club, East Providence, R. I.

Apr. 30-May 1-2, 1952. Rubber Division, A.C.S., Spring Meeting, Netherlands Plaza Hotel, Cincinnati, Ohio.

June 20, 1952. Akron Rubber Group, Summer Outing.

June 23-27, 1952. A.S.T.M. Fiftieth Anniversary Meeting, Hotels Statler and New Yorker, New York, N. Y.

Sept. 14-19, 1952. A.C.S., Annual Meeting, Atlantic City, N. J.

Oct. 29-31, 1952. Division of Rubber Chemistry, A.C.S., Fall Meeting, Hotel Statler, Buffalo, N. Y.

Agree On Stock Exchange Plan

Pennsylvania Salt Manufacturing Co. and Sharples Chemicals Inc. have entered into an agreement whereby Pennsalt common stock will be offered in exchange for Sharples common stock at the rate of 5.15 shares of Pennsalt for one share of Sharples. It is expected that the offer will be made in the latter part of December. In announcing the exchange plan, officers of the two companies pointed out that combining the two businesses will further diversify both. Pennsalt has been engaged principally in the manufacture of inorganic chemicals but in recent years has been extending its activities into the organic field. Sharples Chemicals has specialized in synthetic organics, none of which is presently marketed by Pennsalt. Pennsalt plans to issue up to 88,497 additional shares of common stock in exchange for all outstanding Sharples stock at the agreed-upon rate. The new Pennsalt stock will be part of the 500,965 shares of Pennsalt common stock authorized but not previously issued. If all outstanding Sharples stock is exchanged, Pennsalt's common stock outstanding will increase from 999,035 to 1,087,532. A registered statement relating to the offering of the new Pennsalt stock has been filed with the Securities and Exchange Commission.

KITCHENER-ONTARIO JOINT MEETING HEARS PAPER ON BUTYL CURE RATE

The Kitchener Rubber Group and the Ontario Rubber Section of the Chemical Institute of Canada held a joint meeting on November 12 at the Granite Club in Kitchener, Ont., Canada. Lorne Currie, supervisor of the Butyl Rubber Central Laboratory of the Polymer Corp., Sarnia, Ont., was the principal speaker at the meeting. Mr. Currie spoke on "Chemical Testing for Determination of the Rate of Cure of Butyl Rubber."

In his address, the speaker stated that Butyl rubber is produced on a commercial scale at Sarnia by the catalytic action of aluminum chloride on a mixture of isobutylene and isoprene in the presence of a diluent, methyl chloride. Since the inauguration of Butyl production it has been the practice to determine the curing range by obtaining modulus values on composites of the finished polymer. Many disadvantages and difficulties have been encountered with this procedure including: (1) a time lag of 26 to 30 hours in obtaining reliable results; (2) curing press temperature control; (3) compounding mill roll temperature control; (4) temperature and humidity control in the compounding room; and (5) the purity of compounding chemicals.

The desire to obtain a more reliable and less time-consuming method led to the improvement of the drastic iodine-mercuric acetate procedure for determining the percent unsaturation of butyl rubber to the point where it was very reproducible. The unsaturation values obtained on plant composites were correlated with 40 minute modulus values determined on the same composites. A straight line relationship exists for each grade and for all grades in the same Mooney range.

This method of predicting the cure rates of Butyl polymer has been used for plant control purposes for the past six months with a corresponding decrease in stress-strain testing. Improved product uniformity has been achieved by using this unsaturation method along with quality control charts. The standard deviation of the results obtained by this method is much lower than by stress-strain testing and eventual elimination of the latter method is predicted.

Set Division 1953 Meetings

The Division of Rubber Chemistry, A.C.S., has established definite dates for its 1953 meetings. There will be three Divisional meetings in that year, as follows: (1) A Regional Meeting will be held in Los Angeles, Calif. on March 18-20, with hotel headquarters yet to be selected; (2) The Spring Meeting will be held in Boston, Mass., on May 14-16, with headquarters at the Hotel Statler; (3) The Fall Meeting will be held in Chicago, Ill., on September 9-11, with headquarters at the Sherman Hotel. The Spring Meeting will run from Thursday through Saturday, the first time that a divisional meeting runs into a week-end. The Fall Meeting will be held in conjunction with the regular meeting of the parent society.

ASME RUBBER-PLASTICS GROUP HOLDS ANNUAL MEETING IN ATLANTIC CITY

The annual meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers was held at the Chalfonte-Haddon Hall in Atlantic City, N. J., on November 27 in conjunction with the parent society. The divisional meeting consisted of three technical sessions, one of them held in the evening for the first time, and included the presentation of seven technical papers and two special reports. The meeting was especially well attended, with more than 100 members and guests present at each of the three sessions.

At a meeting of the Executive Committee of the Division, Glen Neeley, of the Richardson Co., Melrose Park, Ill., was elected chairman to succeed Newlin Keen, of the DuPont Rubber Chemicals Division, while M. E. Lerner, of RUBBER AGE, was named secretary to succeed Mr. Neeley. The approval of R. G. Seaman, of the *India Rubber World*, as a member of the Executive Committee was announced. Special gavels made of rubber and plastic were presented to both Mr. Keen, the retiring chairman, and Frank Warner, of the General Electric Co., the former chairman. A Certificate of Merit from the Society was also given to Mr. Keen.

Papers on Plastics

The initial session on the morning of the meeting was devoted to three papers on plastics. The first paper was on "The Effect of Velocity on the Tensile Impact Properties of Methyl Methacrylate," by Bryce Maxwell and J. P. Harrington of Princeton University, Princeton, N. J. Given by Mr. Maxwell, the paper reviewed the history of impact testing of plastics and discussed some of the current theories of impact resistance.

The results of a new study on the effect of velocity on the energy absorbed by methyl methacrylate at various temperatures made with the aid of two new types of testing machines were given by the speaker, the results being interpreted in terms of the classical theories of mechanics of materials and the current theories of the rheology of high polymers.

The second paper was entitled "On the Accuracy of Extrapolated Creep Test Relations for Plexiglas Subject to Various Stresses," prepared by Joseph Marin and Yoh-Han Pao, of the Pennsylvania State College, State College, Penna., and given by Prof. Marin. It was pointed out that most creep time relations for materials are obtained for short periods of time, usually for 1000 hours or about 40 days. In many applications, however, the life of the member is much greater than 1000 hours. For the relations used in the current study on Plexiglas, it was found that the extrapolated values gave good engineering approximations to the actual values.

The final paper at this session was on "High Impact Styrenes," prepared by Sanford E. Glick and C. H. Adams, of the Plastics Division, Monsanto Chemical Co., Springfield, Mass. Presented by Mr. Glick, the paper covered many of the physical properties of the high impact styrenes, a relatively new class of thermoplastic materials. Tables, charts and diagrams were used to illustrate the range of these properties in comparison with those of the general purpose styrenes. Graphs showing the effect of temperature on the physical properties were also shown and discussed.

Data on Heat-Resistant Adhesives

Two papers and a special report featured the second session of the meeting, held on Tuesday afternoon. "Properties of Some Heat-Resistant Adhesives" was the title of a paper by A. J. Kearfott and C. W. Roush, of the General Motors Research Laboratory, Detroit, Mich., which was given by Mr. Roush. The paper covered phenolic resin-oil resistant elastomer type adhesives which in recent years have replaced mechanical means of joining materials in several applications. Automotive applications, including brake linings and transmission parts, were discussed.

E. S. Ebers, of the Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn., gave a paper on "Rubber-Plastic Compositions," which was devoted in large part to Kralastic. The numerous features of this rubber-plastic material were stressed by the speaker who showed specific samples of end-products reflecting each of these features, including toughness, dimensional stability, easy formability, chemical resistance, etc. Mr. Ebers stressed the point that Kralastic can be processed by low cost methods such as simple forming tools, extrusion, or injection molding.

A report on "Selected Plastics Literature References for the Mechanical Engineer for July, 1950, through June, 1951" was made by Gordon B. Thayer, of the Dow Chemical Co., Midland, Mich., at this session. The list comprised 117 references. In addition, Mr. Thayer showed a motion picture, "Inside the Injection Mold," which depicts the filling of a glass-walled mold.

Papers at Evening Session

The evening session also featured the presentation of two papers and a special report. A paper on "A New Rotary Seal for High Speed and High Pressure Applications" was given by T. J. McCusker, of the Precision Rubber Products Corp., Dayton, Ohio. The speaker pointed out that although many concerns have tried to use the O-ring as a rotary, they apparently overlooked several important factors. A new rotary-type O-ring developed by Precision Rubber Products has made it possible to seal speeds at 2000 rpm or more. The probable causes of failure of rotary seals when used at this speed were discussed and their corrections indicated. A comprehensive description of the new seal was given.

Some of the recent developments in the silicone rubbers were given in a paper on "Application of Silicone Rubber" by C. W. Pfeiffer, of the General Electric Co., Waterford, N. Y. These included higher strength silicone rubber, improvements in low temperature properties, and the development of techniques for bonding rubber to metal. One of the latest developments cited by the speaker was that of silicone gum, which he termed "another step forward in the fuller utilization of the properties of silicone rubber."

The special report on "Selected Rubber Literature References for the Mechanical Engineer for July, 1950, through June, 1951" was prepared by R. E. Shrader and R. M. Turner, test engineers of the DuPont Rubber Chemicals Division, and given by Mr. Shrader. (Editor's NOTE: This report is published in full elsewhere in this issue).

List of Presiding Officers

Following the usual practice of the ASME Rubber and Plastics Division, each session was presided over by specially invited officers, as follows: *Morning Session*—Chairman, J. H. DuBois (Plax Corporation); vice-chairman, J. M. Church (Columbia University); *Afternoon Session*—Chairman, C. M. Doede (Connecticut Hard Rubber Co.); vice-chairman, C. F. Hoover (Pequanoc Rubber Co.); *Evening Session*—Chairman, D. F. Fraser (Rodic Chemical & Rubber); vice-chairman, B. L. Lewis (Timius Olsen Testing Machine Co.).

Phillips Secures Chemical Award

The eleventh award for chemical engineering achievement was formally presented to the Phillips Petroleum Co. at an Achievement Award Dinner held at the Waldorf-Astoria in New York City on November 28. Approximately 800 attended the dinner. The award, presented annually by *Chemical Engineering*, was given to Phillips in recognition of its pioneering development of high abrasion furnace black and because of its major contributions to the success of the cold rubber program. Presentation of the award was made by Alfred H. White, professor-emeritus of the University of Michigan and chairman of the Committee on Award, and was accepted for Phillips Petroleum by K. S. Adams, chairman of the board. Introductory remarks were offered by Sidney D. Kirkpatrick, editorial director of *Chemical Engineering* and *Chemical Week*, and a talk on "Conditions Favorable for Technological Achievement" was given by Karl T. Compton, chairman of the Massachusetts Institute of Technology.

General Tire "Whiteway" Casing

A new whitewall automobile tire said to be entirely new and different from any tire offered to United States motorists has been announced by the General Tire & Rubber Co. Made from synthetic rubber, the new tire has been named the "Whiteway." General Tire is withholding details of its new tire until distribution has begun. At the present moment, NPA regulations specifically ban the production of whitewall tires. Trade sources believe that General Tire isn't following the conventional method of making whitewall tires, but has turned to a white paint to give a similar effect. Recently, however, another manufacturer attempted this type of production and the government frowned upon his efforts.

WASHINGTON RUBBER GROUP HEARS STEMPEL AND OSBERG ON POLYGEN

The November 21st meeting of the Washington Rubber Group, held in the auditorium of the Pepco Building, Washington, D. C., featured the presentation of a paper entitled, "Polygen—A New Class of Synthetic Rubbers," by Dr. Guido Stempel, assistant director of research for the General Tire & Rubber Co., and Edward V. Osberg, assistant manager of the Chemical Division of the company.

In their paper, the authors stressed the versatility of the Polygen system, presently limited to specific combinations of high Mooney butadiene-styrene copolymers and petroleum oils. This principle was shown to be the basis of a whole new group of rubbers covering a wide variety of polymers and an almost unlimited number of additives. According to the authors, the Polygen system will lead to many new and interesting properties, hitherto unobtainable by conventional polymerization techniques. They pointed out that with the improvements already realized, the future development of Polygen may result in substantially less dependence on natural rubber, an important factor in national security.

The properties of the present standard Polygen were compared with those of "cold" GR-S, pointing out the advantages of the new type rubber. The authors also covered the economic implications of the Polygen system, emphasizing the dollar savings possible as well as the savings in critically short materials, namely butadiene and styrene. Large-scale usage of Polygen type rubbers, according to the authors, could eliminate the need for alcohol butadiene and free a large quantity of styrene for use by the plastics industry.

Named Taylor Instrument President

Raymond E. Olson, associated with the Taylor Instrument Companies, Rochester, N. Y., since 1917, has been elected president of the company succeeding Lewis B. Swift who was named chairman of the board. In 1927, Mr. Olson was named manager of the Application Engineering Department of the company and in 1944 was elected to the board of directors. One year later he was named general sales manager and in 1946 was elected a vice-president. He is also a vice-president of the Taylor Instrument Companies of Canada, Ltd. Mr. Olson is credited with 23 patents, 13 of them in the dairy instrument field. His predecessor, Lewis B. Swift, took office in 1938 and guided the corporation during the difficult days of World War II and the reconversion period. All other officers of the firm were re-elected.

CONNECTICUT HEARS ADDRESS ON COMPOUNDING OF SILICONE

An address by Richard Savage, of the Chemical Department of the General Electric Co. at Waterford, N. Y., featured the November 30th meeting of the Connecticut Rubber Group, held at Rapp's Restaurant, in Shelton, Conn. Mr. Savage's talk was entitled "Compounding and Controls in Production of G-E Silicones."

Mr. Savage began his talk with a brief description of what the silicone polymer is, and what steps are taken in its preparation from raw materials to chlorosilanes to silicone gum. He said that the gum is converted to rubber stock by compounding with fillers, such as silica aerogel, diatomaceous silicas and others, followed by the addition of peroxide-type vulcanizing agents.

The mechanism of vulcanization was discussed, and it was stated to be the action of free radicals which removed hydrogen from the methyl groups to connect the siloxane network by ethylene bridges. Compounding, he said, is done on conventional rubber equipment. Typical formulations were given together with a tabulation of their physical properties.

The methods of control currently used on the polymer and its compounds were also discussed. Mention was made of some of the technical advances anticipated in the future. The talk concluded with a question and answer period and an exhibit of some of the materials used and the parts made in the silicone rubber field.

Stainless steel parts for the J-47 engine used by Air Force fighter and bomber planes are soon to be manufactured by Firestone to fill a multimillion dollar order which the company recently received.

QUEBEC GROUP HEARS DOWNEY ON ORGANIC SULFUR COMPOUNDS

The November 15th Meeting of the Quebec Rubber and Plastics Group, held at the Queen's Hotel in Montreal, Que., Canada, heard an address by P. M. Downey, research group leader of the Rubber Service Division, Monsanto Chemical Co., Nitro, West Va. Mr. Downey spoke on "Organic Sulfur Compounds."

In his address, Mr. Downey reviewed the recent literature on the structure of MBT; the evidence for its existence in the thione form and its probable existence in the solid state as a symmetrical bimolecular complex. He also reviewed the use of a mixture of 2-(2, 4-dinitrophenylmercapto) benzothiazole and N-cyclohexyl-2-benzothiazolesulfenamide in reinforcing furnace black stocks.

Mr. Downey outlined the preparation of thiazolesulfenamides and their use as accelerators and discussed the vulcanization of GR-S with xanthic sulfides, phenol sulfides, and dithioamines. The use of 4,4'-dithiodimorpholine and N,N' - dithiobis - (β - isopropylamino - proprionitrile) as a replacement for sulfur in high modulus and high abrasion furnace black stocks was also discussed.

The speaker also reviewed the literature on reactions of sulfur with olefinic substances, and the probable systems obtained with the various accelerators. Mr. Downey stated that the thioamines probably yield alkyl-alkyl monosulfide systems.

Reintjes Named Special Assistant

Godfrey L. Cabot, Inc., Boston, Mass., has appointed Harold Reintjes as special assistant to Dr. C. A. Stokes, director of the Research and Development Department. Mr. Reintjes has also been named vice-president and general manager of Petrocarb Equipment, Inc., New York engineering firm jointly owned by Cabot, the Carborundum Co., the Gas Machinery Co., and the Hughes By-Product Coke Oven Corp. Mr. Reintjes has been associate director of the Illinois Research and Development Division of the Great Lakes Carbon Corp. for the last five years. He has been engaged in research and development in an administrative and engineering capacity since his graduation from Rose Polytechnic Institute in 1935 where he received his B. S. degree in chemical engineering. Mr. Reintjes is a registered professional engineer and is a member of the American Chemical Society and the American Institute of Chemical Engineers. In his new capacity, he will maintain headquarters at 30 Vesey St., New York, N. Y.

WILLIAMS ADDRESSES TLARGI ON THEORIES OF COMPOUNDING

Approximately 250 members and guests of the Los Angeles Rubber Group attended the November 6th meeting held at the Hotel Mayfair in Los Angeles. The meeting was sponsored by the Ohio Rubber Co., and featured an address by Dr. Ira Williams, technical director of the J. M. Huber Corp.

Dr. Williams spoke on the more theoretical aspects of compounding rubber. In his address, he stated that at the present time there is no general reference book available on compounding. Information is mostly accumulated through experience or circulation by word of mouth, he opined.

Compounding in other industries, such as the ink industry, has made much progress. Old formulations contained as many as 14 ingredients. Present day formulations contain 3 or 4 ingredients and are better than the old ones, Dr. Williams said.

In research compounding and testing of rubber compounds, dumb-bell test specimens are of little value for obtaining fundamental information. Repeated stressing of the same sample will give results of greater value to the person seeking fundamental information. This will show up the hysteresis characteristics of the compound.

To begin from the beginning on the subject of natural rubber, Dr. Williams said, one should understand more about the material with which he is working. Natural rubber will not dissolve in a solvent until it is oxidized. The ordinary "solutions" or mixtures encountered are actually suspended rubber particles with oxidized interfaces.

Rubber compounds from the internal sense are divided into three parts: (1) the matrix; (2) the chemicals; (3) the fillers.

The matrix may be single phase or poly phase. The single phase consists of rubber plus oils, waxes, or resins, or all three. The poly phase consists of natural rubber plus some synthetic rubber plus oils, waxes, and resins. The single phase matrix may be identified by the change in refractive index or the oil bleeding out of the mixture, etc., but can be more clearly demonstrated by making it into a cement. In a single phase compound containing oil it makes little difference whether the oil is added before or after vulcanization. The ultimate effect is the same on the vulcanizate as to its physicals; however, the presence of oil affects rate of vulcanization.

Chemicals are generally soluble in the rubber and therefore become a part of the matrix. Accelerators affect the time of cure required. Increasing the amount of a given type of accelerator may not change the time of cure at a lower temperature. When the temperature is lowered a change in type of accelerator may be necessary to reduce the time of cure, i.e., if the same rate of cure of a compound is desired, it is necessary to change the type of accelerator and/or the temperature.

Fillers are used to change the characteristics of the matrix. Certain fillers tend to impart a degree of "wetness" to the compound. In this class are: carbon black, zinc oxide, zinc sulfide, iron oxide, and lignin. Others seem to decrease the "wetness" of the compound. These are clays, whitings, barium sulfate, calcium silicate, etc. This classification has no fine line of demarcation but is used to illustrate some differences noted. The "wet" pigments are not necessarily easily dispersed.

Actually, the shape of the particle is of primary concern. Rubber flows in layers like water. Particle shape therefore affects the flow as well as tear resistance and other physical properties. Spherical shapes have the least affect on flow although excesses of any shapes result in a tendency to pack or flocculate in groups. Needle-shapes tend to flocculate or pack more than the spherical shapes, the speaker asserted.

It has been shown by experiments in which the particle size of clay was reduced and the shape changed from needle to sphere in the process that the viscosity of the compound was lower when the particle shape more nearly approaches the spherical. The one pigment of most interest is carbon black, but we should be very much interested in any spherical particle shapes regardless of source, he said.

Theory of packing or flocculating of various shapes may be explained along following lines: Rhombohedral shapes give 26% voids; spherical shapes give 63% voids; cubical shapes give 47% voids. The flocculation tendencies of different particles are related to these comparisons.

Pangborn Corp., Hagerstown, Md., has released a new 6-page brochure on fast, low-cost drum cleaning. The bulletin explains how the company's Rotoblast technique cleans drums by throwing metallic abrasives against drum surfaces by centrifugal force. Ask for Bulletin No. 220.

WSB APPROVES WAGE AGREEMENT BETWEEN "BIG FOUR" AND UNION

The Wage Stabilization Board, on November 29, approved the 13-cent hourly wage increase negotiated last summer between the "Big Four" and the United Rubber, Cork, Linoleum and Plastic Workers of America (CIO). The board, however, denied two relatively minor phases of the agreement. The increases were negotiated by the union and the U. S. Rubber Co., Firestone Tire & Rubber Co., B. F. Goodrich Co., and Goodyear Tire & Rubber Co.

Seven of the 13 cents will be retroactive to the effective dates of the contracts as follows: U. S. Rubber, August 3, 1951; Firestone, July 30, 1951; Goodyear, August 27, 1951, and Goodrich, August 6, 1951. This seven cents, out of the 13-cent total, is composed of six cents which the board found the workers were entitled to under the 10 per cent "catch-up" formula, plus one cent to be paid to increase night shift differentials or in lieu of such an increase. The "catch-up" permits a 10 per cent raise in wages beyond the rates effective in January, 1950.

The other six cents out of the total was made retroactive to Oct. 16, 1951. This is to compensate for increased living costs from January through October. Union members of the board objected to the board's failure to make this latter six cent increase retroactive to the effective date of the contracts as in the case of the other seven cents.

Besides this limiting of part of the retroactive effect of the increase, the board refused to approve part of the U. S. Rubber contract which would have compensated workers at triple time instead of the present double time for work performed on six holidays a year.

The agreements with the four major rubber companies cover more than 100,000 workers. The workers averaged $1.78 an hour in straight time wages in July of this year.

Standard Plans Kentucky Plant

A recent court order reaffirming an industrial zone classification has cleared the way for the Standard Products Co. of Cleveland, Ohio, to open a plant at Fayette, Ky., for the manufacture of automotive specialties. Standard Products has arranged to purchase the building once occupied by the Karpen Furniture Co. at Fayette for about $250,000. Company officials estimated that at the start of production the plant will employ about 100 persons. The firm had intended opening a plant at Versailles, Ky., but withdrew after some opposition had been expressed.

Brooklyn Fire Damages Rubber

A fire on November 26 at a warehouse in Brooklyn, N. Y., damaged 250 tons of natural rubber owned by the Treasury Department. The fire was under control in about two hours but not before 24 fire companies numbering 150 men had been called in to battle the blaze. As a result of the fire the roof of the building collapsed. Two firemen required medical attention.

NAITD MEETING HEARS SPEAKERS ON RUBBER INDUSTRY SITUATION

A number of interesting speakers addressed the annual convention of the National Association of Independent Tire Dealers on October 30 at Washington, D. C. Leland Spencer, chief of the Synthetic Rubber Division of the Reconstruction Finance Corp., said that so far as rubber is concerned, the nation is in good shape. But he made it clear that the rubber picture is liable to change without notice. Present steps include keeping the commodity controlled as long as there exists the slightest danger to national security, he declared.

Mr. Spencer reported that tire production is booming, with military rubber orders being met on schedule. He also stated that the stockpiling program is proceeding nicely and world rubber production is on the rise. This situation he contrasted with the critical rubber picture of a year ago. He said the changeover was accomplished with little inconvenience to the rubber goods buying public or the labor force that makes the rubber goods.

The National Production Authority, he said, helped to do this job. However, the biggest factor in the nation's favor has been time, he said, time to prepare for whatever may lie ahead in connection with rubber. Mr. Spencer said those preparations are still going on and will go on until there is no danger to the national security. Meanwhile, the rubber industry's biggest job is the rebuilding of inventories which he termed "dangerously low." He said the work must proceed with all possible speed.

Humphreys Speaks of Future

In his address before the convention, Harry E. Humphreys, Jr., president and chairman of the U. S. Rubber Co., predicted that automobile tires of the future will be tougher than today's tires, yet the public will use more than at present. Production will have to be boosted to keep pace with the growing population and increased use of motor vehicles, he said. The market for truck, bus and farm tires will expand even more rapidly than for passenger tires during the next 10 years, he added.

Mr. Humphreys scoffed at "prophets of doom" who think the increasing quality of tires will some day kill the replacement tire business. "We have seen the market for tires increase in the face of advance in quality," he said. "The better we make tires, the more people use them. When we give the motorist more tire value for his money, it helps reduce the cost of car ownership and thereby puts more vehicles and tires on the road."

Mr. Humphreys pointed out that in 1910 a car owner obtained only 238 miles for each dollar spent on tires. In 1930 this figure had increased to 1,400 miles and in 1950 to 2200 miles per dollar. He said tires of the future will be even better. "It appears to me," he said, "that synthetic rubber and other synthetic materials have only begun to reveal their great promise as tire materials. Furthermore, our scientists are beginning to suggest that certain radically new techniques for building tires may one day give us a product of still higher quality with low production cost."

In addition to predicting a bright future for the tire segment of the rubber industry, he outlined an optimistic future for the industry as a whole. He said growth during the next 10 years will match or exceed the average for all industry. Pointing to new developments and greater diversification, he declared that "the growth possibilities in plastics, particularly, are astounding. Uses for many of them are multiplying so rapidly that production is doubling at the rate of once every three years or less."

He forecast total industry sales of $5 billion for 1951, with profit after taxes something less than five per cent of sales. He said rubber is being consumed at the rate of 1,253,000 tons a year, about the same as in 1950. Of this total, 63 per cent is synthetic and 37 per cent natural rubber. "The fact that the proportion of synthetic to natural can be raised this high and still maintain satisfactory quality," he said, "is the best testimonial that can be given for present-day synthetic rubber quality, which is improving month by month."

Other Speakers At Meeting

Other speakers who were heard at the NAITD meeting included W. A. Blees, vice-president of the Crosley Corp. who discussed salesmanship in the current booming market; Donald M. Hobart, vice-president and research director for the Curtis Publishing Co., who spoke on an extensive survey his firm made on the tire and car buying habits of the nation; Willard England, of the government's tank-automotive center at Detroit, Mich.; and W. G. Godsell of Worcester, England. Mr. Godsell, founder of the National Tyre Distributors' Association in England, spoke on the marketing of tires in his country.

CHICAGO HOLDS PANEL MEETING ON RUBBER-TO-METAL BONDING

The November 9th meeting of the Chicago Rubber Group, held at the Morrison Hotel in Chicago, Ill., featured a symposium on the "Bonding of Rubber to Metal." Approximately 260 members and guests attended the meeting. Dr. H. A. Winkelmann (Dryden Rubber) acted as moderator for the session.

The panel members included the following: S. L. Brams (Dayton Chemical Products); C. G. Cashion (Xylos Rubber); M. E. Jones (Marbon); G. C. Maassen (R. T. Vanderbilt); H. B. Puff (Durez Plastics); and R. Smith-Johannsen (G-E).

Display booths illustrating products of rubber bonded to metal were presented by the B. F. Goodrich Co., General Electric Co., R. T. Vanderbilt Co., Marbon Corp., Xylos Rubber Co., Dayton Chemical Products Laboratories, Inc., and the Dryden Rubber Division of the Sheller Manufacturing Corp.

A full presentation of the symposium will appear in a future issue of RUBBER AGE.

RHODE ISLAND ELECTS OFFICERS AND HEARS ADDRESS BY STEMPEL

On November 15th, the Rhode Island Rubber Club met at the Metacomet Golf Club in East Providence, R. I., to hear an address by Dr. G. H. Stempel, assistant director of research for the General Tire & Rubber Co., and elect officers for the 1952 season of the group. The following members were elected to office:

Chairman, C. Leigh Kingsford (Davol Rubber); *Vice-Chairman*, Roy G. Volkman (U. S. Rubber); *Secretary-Treasurer*, Francis D. Burger (Kleistone Rubber). W. Kenneth Priestley (U. S. Rubber) and John MacKay (Phillips Petroleum) were elected as directors of the group for a three-year period. H. P. Fuller, now retired but formerly associated with the Pequanoc Rubber Co., was chairman of the Nominating Committee.

The following members were retained in office for completion of unexpired three-year terms as directors: Raymond Szulik (Acushnet Process), Gilbert Enser (Collyer Insulated Wire), Urbain J. H. Malo (Crescent) and Harry Ebert (Firestone).

Dr. Stempel spoke on "The Practical Utilization of High Mooney Viscosity Synthetic Rubber." His address was similar to one he previously delivered before the October 23rd meeting of the Buffalo Rubber Group at Buffalo, N. Y. A full report of this address appears in the November issue of RUBBER AGE.

Goodyear Plans Gadsden Addition

Plans for a large addition to the Goodyear Tire & Rubber Co. plant at Gadsden, Ala., have advanced to the point where applications for material and equipment priorities have been made to authorities in Washington, D. C. If restricted materials, particularly steel, become available, the existing plant will be enlarged by 270,000 square feet of floor space and the production of large military airplane tires and truck tires will be substantially expanded. Construction plans have been completed and appropriations have been made by Goodyear for the project. Construction time normally would be something in excess of six months if essential materials and equipment were available. An increase in employment at the Gadsden plant of between 600 and 800 would be provided by the expansion program. Goodyear built the original Gadsden plant in 1929 and has enlarged it substantially.

Firestone in German Arrangement

Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., announced recently in Akron, Ohio, that negotiations have been completed with Albert Schafer, board chairman of Hamburger Gummiwaren-Fabrik Phoenix Aktiengesellschaft in Hamburg, Germany, providing for the interchange of technical information and assistance between the two companies. This will enable the German company to produce tires and tubes of the same quality as Firestone and also give Firestone the benefit of technical developments of one of the major rubber companies in Europe.

NAMES IN THE NEWS

R. S. Riggs, who is in charge of rubber and plastics research at the Bell Telephone Laboratories at Murray Hill, N. J., has been elected chairman of the North Jersey Section of the American Chemical Society. V. N. Morris, director of research for the Industrial Tape Corp., is chairman-elect.

Professor Edward R. Schwartz, head of the Textile Division, Massachusetts Institute of Technology, received the Harold DeWitt Smith Memorial Medal on October 16, at the Fall Meeting of ASTM Committee D-13 on Textile Materials held in New York City.

William H. Couch, formerly associated with the Elm City Rubber Co., has joined the staff of the Whitney Blake Co. in Hamden, Conn.

Kenneth Tewell, formerly associated with the Schacht Rubber Mfg. Co. at Huntington, Ind., has joined the Roth Rubber Co., Cicero, Ill., as chief chemist.

Paul W. Libbey, previously associated with the Firestone Tire & Rubber Co. at Des Moines, Iowa, has been named assistant manager of the Industrial Products Division of the J. M. Huber Corp., at Borger, Tex.

Robert Campbell, formerly Chicago sales representative for the New Jersey Zinc Sales Co., has been transferred from the Pigments Division to the Metals Division of the company.

John M. Sapinsley, formerly executive vice-president of the Crescent Co., Pawtucket, R. I., has been named president of the company succeeding Milton C. Sapinsley, who has been named chairman of the board.

Jerome T. Coe, previously a manufacturing engineer at the silicone plant of the Chemical Division, General Electric Co., Waterford, N. Y., has been named customer service supervisor for silicone products with offices at Waterford.

Colin M. Stewart, associated with the B. F. Goodrich Co. since 1934, has been named senior sales representative of the Automotive, Aviation and Government Division of the company in the Detroit district succeeding Clarence W. Wacker, who has retired after 40 years' service with the company.

Harvey S. Firestone, Jr., chairman and chief executive of the Firestone Tire & Rubber Co., has agreed to serve as co-chairman of the Religious Organizations for Brotherhood Week to be observed throughout the nation February 17 to 24, under the sponsorship of the National Conference of Christians and Jews.

James S. Wolfe, formerly technical representative for the B. F. Goodrich Chemical Co. at Chicago, Ill., has been named Washington, D. C., representative succeeding R. H. Williams, who has been assigned to a new post.

Carl C. Monrad, who has been serving as a consultant to the Office of Rubber Reserve, has been named Columbia-Southern research professor in chemical engineering at the Carnegie Institute of Technology as a result of a grant from the Columbia-Southern Chemical Corp.

Alfred Lippman, Jr., formerly associated with the Bay Chemical Co., has joined the Commonwealth Engineering Co., Dayton, Ohio, as general manager of its laboratories.

E. F. Gates, formerly assistant to the manager of accessories and repair materials sales for the Seiberling Rubber Co., has been promoted to department manager. He will also supervise treading and repair at the company's Akron sales and service center.

H. F. Robertson has been named controller of the Quaker Rubber Corp., a division of the H. K. Porter Co., Inc., Philadelphia, Penna.

Richard L. Hueer, associated with the Hercules Powder Co. since 1942, has been named manager of the Cleveland, Ohio, office of the Cellulose Products Department of the company.

George C. Miller, associated with the Industrial Rayon Corp. since 1945, has been named sales manager of the Textile Yarn Division of the company.

M. Foster Fraleigh, chief engineer of the Andrews-Alderfer Products Co., was recently elected president of the Mercator Club in Akron, Ohio.

K. Jerry Morray, formerly a silicone sales representative for the Chemical Division of the General Electric Co. in the Cleveland, Ohio, area, has been transferred to the company's silicone plant at Waterford, N. Y. as a headquarters' sales specialist. Milton C. Lauenstein, Jr., associated with G-E since April of this year, has succeeded Mr. Morray in Cleveland.

Dr. Robert V. Yohe, president and general manager of American Anode, Inc., a subsidiary of the B. F. Goodrich Co., recently received a Goodrich 20-year service emblem at special ceremonies in Akron, Ohio.

Sam Gurley, Jr., formerly associated with the Borden Co., has been appointed manager of resin sales by the Barrett Division, Allied Chemical & Dye Corp.

Arnold Dahlstrom, vice-president of the Crescent Co., Pawtucket, R. I., has been named to head a new company department covering government procurement activities.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., was recently paid tribute by the Bicycle Institute of America for more than a half-century of work in the development and production of bicycle tires.

John W. Conyers, Jr., a recent graduate of the Graduate School of Business Administration, University of Michigan, has been appointed sales analyst in the Philadelphia, Penna., office of Sharples Chemicals Inc.

J. W. Hibbott has been named to the newly-created post of assistant divisional manager of the Bauer & Black Division of the Kendall Co., Chicago, Ill. R. M. Hoey has succeeded Mr. Hibbott as works manager of the division, while A. P. Hurt has been named plant superintendent and production manager.

James Stanfield has been named assistant to the president of the Flexible Tubing Corp., Guilford, Conn.

Bryant C. Ross has been appointed Eastern rubber products manager for Sharples Chemicals Inc. with headquarters in Philadelphia, Penna.

Thomas R. Grimes, associated with U. S. Rubber since 1939, has been named sales manager of U. S. Royalite plastic products. William M. Coy, also with the company since 1939, has been named sales manager of U. S. Chemical Sponge.

John F. Ziesere, associated with the West Virginia Pulp and Paper Co. since 1924, has been appointed Chicago district manager of the Industrial Chemical Sales Division of the company succeeding John P. Harris, who has retired.

J. E. Hofmann, associated with the U. S. Rubber Co. since 1920, has been named superintendent of the North Bergen, N. J., latex depot.

Aaron Coutts has resigned as president of the Rubber Corporation of Calif., Garden Grove, Calif.

Dr. J. O. Hendricks, associated with the Minnesota Mining & Manufacturing Co. since 1936, has been appointed to the newly-created post of associate director of the Central Research Laboratories.

Kenneth F. Trimble, formerly Milwaukee district manager for the Gro-Cord Rubber Co., Lima, Ohio, has been named sales manager of the company succeeding B. H. MacLeod, who has resigned.

L. C. Cole, nationally known advertising agency head, has been appointed director of sales for the National Motor Bearing Co.

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NPA CITES TWO RUBBER FIRMS FOR EXCEEDING LEGAL QUOTAS

The National Production Authority has ordered the Pacific Tire & Rubber Co. of Oakland, Calif., to suspend any further consumption of natural or synthetic rubber as of November 29. The government agency also ordered the Armstrong Rubber Co. of West Haven, Conn., to reduce its new rubber consumption after finding both firms in violation of the rubber consumption limitation regulation.

During the seven-month period between March and September of this year, the government charged, Pacific Tire used "600,000 pounds of new rubber more than it was legally entitled to consume." NPA estimated this amount of rubber is sufficient to make more than $1,000,000 of new automobile, truck and bus tires.

The suspension ordered by NPA is temporary, but it will remain in effect until the company's case is heard. NPA said it has filed an application for permanent suspension of the firm's right to consume new rubber. In addition, the agency will seek to deprive Pacific Tire & Rubber of all future Government priorities and allocations assistance. The case probably will be heard before an NPA hearing commissioner on the West Coast, but no date has been set. Pacific Tire & Rubber manufactures passenger, truck and bus tires as well as repair materials and camelback.

NPA enforcement chief Robert H. Winn described the suspension order as "one of a series which reflect NPA's vigorous enforcement policy. Any concern which exceeds its allowable usage of new rubber by more than a half million pounds over a seven-months period gains considerable competitive advantage over honest tire manufacturers, and hinders the mobilization effort," Mr. Winn said.

Pacific Tire & Rubber in its present form was organized at the beginning of this year, following acquisition of a one-half interest in the predecessor company, Pacific Rubber Co., by Inland Rubber Corp., a subsidiary of Mansfield Tire & Rubber Co. of Mansfield, Ohio. General Tire & Rubber Co. has a substantial interest in the latter company.

On December 2nd, radio commentator Drew Pearson charged that Edwin W. Pauley and the General Tire & Rubber Co. own Pacific Rubber. He also connected Dan Kimball, present Secretary of the Navy and former General Tire executive with Pacific Tire. In an address before the Women's National Democratic Club in Washington, D. C., on December 3, Mr. Kimball branded as "false and untrue" Mr. Pearson's statement that he had any connection with Pacific Tire.

Mr. Kimball stated that he had resigned his position with General Tire when he accepted his Navy assignment and there was no connection between General Tire and Pacific Tire while he was connected with the firm. Mr. Kimball said the people who hear the columnist never hear the retraction and that what bothers him is that Mr. Pearson destroys the "faith of the people in the Navy Department."

In the case of the Armstrong Rubber Co. and its three affiliates, NPA ordered them to reduce their authorized consumption by 920,084 pounds during December. The companies admitted using 9,777,083 pounds of new rubber in automobile tires during the third quarter, when their authorized usage was only 8,856,999 pounds.

NPA estimated that 92,000 tires were produced with the excess rubber by the company, one of the nation's largest auto tire manufacturers. A public hearing showed, NPA said, that the violations "were occasioned by erroneous interpretation" of the Rubber Order, M-2. Affiliated companies involved in the action were Armstrong Rubber Co., Des Moines, Iowa; Armstrong Tire & Rubber Co., Natchez, Miss., and Armstrong-Norwalk Rubber Corp., Norwalk, Conn.

NEW POLYMERS AUTHORIZED BY RFC SYNTHETIC RUBBER DIVISION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Synthetic Rubber Division, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quantities of one or two bales upon request to the Synthetic Rubber Sales Division or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X No.	*Polymer Description*
X-678 GR-S Latex	Butadiene/styrene charge ratio 70/30 polymerized at 50° F., activated with PMHP or equivalent, and diethylenetriamine; emulsified with potassium oleate. Shortstopped with sodium or potassium dimethyl dithiocarbamate. Mooney viscosity of the contained polymer 150-175 ML-4 at 212° F. Total solids 58-62%.
X-686 GR-S	Oil-black-rubber masterbatch, the same as X-629-GR-S except that the carbon black is Aromex instead of Philblack O.
X-687 GR-S	Same as X-580-GR-S except that the carbon black is Continex HAF instead of Philblack O.
X-688 GR-S	Same as X-598-GR-S except that the carbon black is Continex HAF instead of Philblack O.
X-689 GR-S	Butadiene/vinyl toluene charge ratio 75/25 polymerized at 41° F., activated with PMHP or equivalent, emulsified with Rosin soap L.M. 2.19.0.3. Shortstopped with sodium or potassium dimethyl dithiocarbamate and either sulfur as polysulfide or polyamine H or equivalent. Stabilized with 1.25% (on the rubber) BLE (or equivalent). Mooney viscosity 50 ± 7 ML-4 at 212° F.
X-690 GR-S	A masterbatch of 60 parts Dutrex 20 and 100 parts of a higher Mooney polymer otherwise identical with the base polymer in X-663-GR-S, except that the shortstop is sodium or potassium dimethyl dithiocarbamate and sulfur as sodium polysulfide or equivalent.
	Please Note Changes in the Following Polymer Descriptions
X-620 GR-S	Stabilized with 1.25% ELGI instead of 1.5 parts ELGI.
X-668 GR-S	Shortstopped with sodium or potassium dimethyl dithiocarbamate and either polyamine H (or equivalent) or sulfur as sodium polysulfide instead of DNCB.
X-669 GR-S	Shortstopped with sodium or potassium dimethyl dithiocarbamate and either polyamine H (or equivalent) or sulfur as sodium polysulfide instead of DNCB.

NOTE: The above new polymers are experimental only and the Synthetic Rubber Division, Reconstruction Finance Corporation, does not make any representation or warranties of any kind, express or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

Plans Polybutene Production

Pan-Am Corp., a subsidiary of the Standard Oil Co. of Indiana, is entering the petro-chemical field. The company has awarded contracts for two new units at its El Dorado, Ark., refinery which will have a capacity for producing 2,000,000 gallons of polybutene a year, more than the nations current production, as well as 3,800,000 gallons of propylene tetramer. The new propylene unit is scheduled to be completed by February, 1952.

NSC REPORT ON WINTER DRIVING HAZARDS EVOKES INDUSTRY COMMENT

The publication of the 1951 report of the Committee on Winter Driving Hazards of the National Safety Council entitled "What About Special Tires for Winter Driving?" has prompted rubber industry executives to take issue with the statements expressed in the report. NSC, in its report, stated that the war-born use of cold synthetic rubber in most tires now being produced has increased the danger of skidding because of less effective stop-and-go traction ability on snow and ice. The Council said exhaustive winter driving tests conducted earlier this year had proved the need for motorists to drive more cautiously with synthetic tires.

Professor A. H. Easton, director of the University of Wisconsin's truck research project and chairman of tests for the Council's Committee on Winter Driving Hazards, was technical supervisor of the latest series of experiments on stopping and traction abilities of various types of tires on hard packed snow. Similar tests had been made previously on glare ice and loose snow.

According to the report, natural rubber tires, manufactured before defense requirements forced tire companies into using more synthetic rubber, were 8 percent superior to similar present day synthetic tires in stopping on hard-packed snow and 47 percent better in traction ability. On glare ice, natural rubber treads were 10 percent better in stopping ability and 16 percent better in traction ability. It was pointed out, however, that synthetic tires wear better, perform normally on dry or wet pavements and have other advantages.

Defines Winter Tire Types

The tests indicated that on snow and ice even the specialized winter tires now appearing on the market showed relatively little over-all improvement over conventional tires in comparison with stopping and traction ability possible by using reinforced tire chains, Dr. Easton said.

The test report defined three types of special winter tires: "winterized" tires of conventional tread containing embedded materials or fine lacerations and cuts; "mud-snow" tires characterized by a deep tread pattern or lug design and "winterized mud-snow" tires combining deep tread with the lacerating treatment. "While the performance of several specialized tires shows definite improvement for specific conditions over conventional tires, their over-all improvement is not great enough to warrant less care or precaution when driving on slippery surfaces," Dr. Easton warned.

"As an example, the stopping distance on glare ice of the best specialized tire tested is still about eight times the normal stopping distance on dry concrete. Several of the specialized tires, although showing some improvement under specific conditions, are no better, and in some cases even worse, than the conventional tread tires under other conditions.

On the basis of stopping and traction tests conducted during January of this year of representative specialized tires on the rear wheels only, the most significant findings, Dr. Easton said, were:

(1) Stopping distances with conventional tires on hard-packed snow were about three times the normal stopping distance on dry concrete. With the best of the specialized tires, stopping distances on packed snow were about two and one-half times the dry concrete distances, and with reinforced type tire chains stopping distances on packed snow were nearly twice that obtained on dry concrete.

(2) "Winterized" tires offered an average improvement of about 5 percent in stopping ability on hard-packed snow, but their traction ability was 10 percent less than conventional tread natural rubber tires.

(3) Tires of the "mud-snow" type reduced stopping distances on hard-packed snow an average of 13 percent compared with conventional tread natural rubber tires. In traction ability, one of the tires of this group showed an increase of 47 percent over conventional tires, whereas the other showed an improvement of only 1 percent.

(4) "Winterized mud-snow" tires showed an average improvement of 17 percent in stopping ability, and 19 percent in traction ability on hard-packed snow compared with conventional tread natural rubber tires.

Alleges Chain Advantage

"Reinforced tire chains are far superior to the best of the tires tested," said Dr. Easton, "both in stopping and tractive ability on hard-packed snow. They showed an improvement over conventional tread natural rubber tires of 39 percent in stopping ability, and 273 percent in traction ability. On glare ice their improvement averaged 56 percent for stopping and about 650 percent for traction ability or grade climbing."

With reinforced chains, the tests revealed, a car can climb a grade of about 23 percent on ice or snow, while the best of the special winter tires can negotiate only a 4 percent grade on glare ice, and an 8 percent grade on hard-packed snow.

Industry Offers Rebuttal

Spokesmen for the rubber industry declared that the Council's report was not a correct presentation of the facts. They said that experienced engineers in the rubber industry have shown that a tire's tread design is the most important factor in determining the stop-and-go ability of a tire under all driving surfaces.

Once the temperature falls below freezing, they said, the natural treads have a slight advantage, but hardly enough for the average motorist to notice it. They emphasized that the skill of the driver is still the number one factor in determining how a tire performs under all conditions. Next is the vehicle itself, its design, weight and power. Factor number three is the condition of the highway, rain, ice or snow. Next in importance, they feel is the air temperature, ice is slicker at 32° than at 0°. Then comes the tread design and finally the compound of which the tread is made.

Typical of the comments by industry figures on the findings of the NSC report was one by L. A. McQueen, vice-president in charge of sales of the General Tire & Rubber Co. Mr. McQueen took issue with the Council statement that synthetic tires weren't the equal to natural rubber in traction. Questioning the timeliness of the Council report, he added it is contrary to all industry findings and very definitely out of line with tests of General Tire's new oil-enriched rubber.

"Our industry has records to show that man-made rubber has met every test superbly," Mr. McQueen commented. "While the progress in the last five years has been almost miraculous, this is relatively little when compared with the advancement we now know will be made in the next five years.

"Not only will the synthetic rubber industry's developments enable us to make tires safer, free from punctures, but the tires will be streamlined in design that will make steering and stopping easier and safer, and also make the tire itself a thing of beauty," Mr. McQueen added.

Rubber Division Invites Papers

The Papers Committee of the Division of Rubber Chemistry of the American Chemical Society is soliciting abstracts of papers to be presented at meetings scheduled in 1952. Plans are progressing for two meetings, one on April 30, May 1 and 2 in Cincinnati, Ohio, and the other from October 29 to 31 at Buffalo, N. Y. Abstracts of papers to be presented at the April meeting should run to about 200 words. Three copies of the abstract must be in the hands of the Secretary, C. R. Haynes, Binney & Smith Co., 41 East 42nd St., New York 17, N. Y., by February 29, 1952. Persons submitting abstracts must state in what laboratory the work was done, time desired for presentation, and who will present the paper if there is more than one author. The Spring Meeting in Cincinnati is being sponsored by the Southern Ohio Rubber Group with Stewart L. Brams (Dayton Chemical Products) as general chairman and Donald Bertke (Texo) as associate chairman and treasurer. The 25-Year Club will hold a luncheon on April 30 with A. C. Eide (American Zinc Sales) as chairman. The usual banquet will be held on the evening of May 1 with Fred Rohel in charge.

Automotive Rubber Buys Plant

Automotive Rubber Co., Detroit, Mich., has acquired the plant of the Texas Tank Co. at Houston, Texas, which it will operate as the Arco Rubber Processors Division. Structural alterations and the installation of special rubber processing equipment have already been started. The tract includes three acres and three buildings. The new Houston operation will specialize in engineering, manufacture and installation of rubber insulated tanks, tank cars, exhaust systems, pipes and other goods.

U. S. Navy Honors Werkenthin

Theodore A. Werkenthin

Theodore A. Werkenthin, head of the Elastomer Branch of the Research and Development Division, Bureau of Ships, U. S. Navy, was presented with the Distinguished Civilian Service Award on November 13 at special ceremonies in the Pentagon, Washington, D. C. The award was made to Mr. Werkenthin in recognition of his outstanding work on the uses of natural and synthetic rubber. Anticipating another natural rubber shortage such as that which existed during World War II, he evolved a program working toward complete independence of foreign grown rubber. The goal has been met so closely that only 2 out of 120 Bureau of Ships' specifications require natural rubber. The citation presented to Mr. Werkenthin read as follows: "This honor, the highest of the Navy's civilian awards, is bestowed upon Mr. Werkenthin for his outstanding direction of the rubber research and development program for the Bureau of Ships, for his exceptional performance as rubber consultant for the Bureau on the use of natural and synthetic rubber and plastic elastomers, and for the exemplary manner in which he has performed the duties of his position so as to command the respect of not only his colleagues within the Bureau and other defense agencies, but of the rubber industry as well." Mr. Werkenthin is a member of the Council of the Rubber Division of the American Chemical Society, and is one of less than a score of Americans elected a Fellow of the Institution of the Rubber Industry of London, England.

Stauffer Opens New Laboratory

Stauffer Chemical Co., New York 20, N. Y., has completed a new laboratory adjacent to its plant at Chauncey, N. J., where additional facilities for pilot plant work are maintained. Dr. J. T. Bashour will be in charge of the laboratory which has 16 rooms and offices. Construction was started in July, 1950, and all facilities, including parking area and landscaping, were recently completed.

Goodrich Tests Washington Tax

The B. F. Goodrich Co. has asked the United States Supreme Court to review the validity of a State of Washington business tax. The company has asked the court to determine if the tax is invalid when applied to three types of business it does in the state. The tax is of the gross receipts type and is levied for the privilege of engaging in business in the state.

Goodrich contended it was exempt from taxes measured by receipts from sales in interstate commerce to Washington State buyers where delivery is made to the Washington purchaser f.o.b. from a point of shipment outside the state. The Washington State Supreme Court said such receipts could be taxed since sales were channeled through the company's local outlets in the state. In a cross appeal, the State of Washington asked the U. S. court to rule that two other types of business could be taxed by the state.

The state's appeal was from parts of a decision by the Washington State Supreme Court. The state's high court said the two types were not taxable because of the Federal Constitution's ban on interference with interstate commerce.

In one of the two types, orders were sent by purchasers directly to a Goodrich office outside the state. Orders were filled by shipment directly to the purchaser without any action on them by Goodrich offices in Washington.

The other type involved a contract between the New York office of the J. C. Penney Co. and the Watertown, Mass., home office of Goodrich's Hood Rubber Division. Goodrich's local offices in Washington State had nothing to do with completing the contract.

Thiokol Plasticizer Availability

Thiokol Corp., Trenton, N. J., has announced that Thiokol TP-90B and TP-95 plasticizers, both of which have been in short supply for the past two years, are now available without ratings from the company. Thiokol reports that its raw materials suppliers have extended their facilities so that they can now supply the company with adequate quantities. In turn, Thiokol has expanded facilities for making the plasticizers so that it can now accept unrated orders. While the supply at the moment is not overly abundant, compounders should be able to secure the plasticizers without too much delay.

Names New England Agency

The Chemical Division of the Golden Bear Oil Co., Oildale, Calif., has announced the appointment of the W. D. Egleston Co., of Cambridge, Mass., as representative for the New England states. With this appointment, the company's compounding ingredients for the rubber industry are now available from centrally located warehouses in most parts of the United States. Other agents handling the company's petroleum products include the Akron Chemical Co., Harwick Standard Chemical Co., and H. M. Royal, Inc.

Hatch Named Plant Manager

T. George Hatch

T. George Hatch, associated with the B. F. Goodrich Co. for the past 29 years, has been named manager of the company's plant at Cadillac, Mich., succeeding Carl J. Tsaloff who has been named production manager of the Aeronautical Division with headquarters at Akron. Mr. Hatch started his career with Goodrich as a factory employee in the Industrial Products Division, where he became a foreman in 1930. A year later he was transferred to the Los Angeles, Calif., plant, where he remained until 1942, when he became a foreman at Plant 4 in Akron. He had been a general foreman for several departments making extruded goods for the last five years. Mr. Tsaloff has been with Goodrich for 18 years, starting as a factory employee and becoming a floor and shift foreman while attending Akron University. He was a production and technical staff man in the Lone Star ordnance plant at Texarkana, Texas, which the company operated for the government during the war years. Returning to Akron he became a conference leader in the educational program and then night shift superintendent at Plant 4, before he went to Cadillac.

Plastex Products Co. Formed

The Plastex Products Co. has been formed at 312 Dobbs St., Marietta, Ga., for the manufacture of rubber products from natural and synthetic latex and vinyl plastic resins. One of the primary purposes of the company is the development and production of compounds to customer specifications. Company officials state that the plant is equipped to handle small custom job orders or to contract for the volume manufacture of various finished and semi-finished goods, according to specifications, by dipping, slush molding, spraying or other techniques. R. T. Henson is president of the new concern.

Ball Brothers Co., Inc., Muncie, Ind., has announced the creation of a new Consumer Products Sales Division which will be responsible for the sale of Ball home canning supplies and the development of consumer products that may be sold on a year-round basis.

Swinging Rubber Door Developed

A swinging rubber door, so light and flexible it can be bent to a right angle, has been developed to replace heavy wooden doors in cold storage warehouses by Stic-Klip Manufacturing Co., Cambridge, Mass. The new door will eliminate the costly maintenance and damaging of conventional wooden doors caused by power trucks hanging into the doors to open them. The rubber door, which swings open at a touch, easily absorbs the shock of the trucks, gives maximum ease of passage, and returns to its normal closed position. Actually a reinforced air container, the door is constructed of an outer layer of heavy cloth-inserted rubber which covers a "frame" of 2-inch rubber tubing. Support and resiliency are provided by 15 to 25 inflated rubber bladders especially designed and manufactured by the Dewey & Almy Chemical Co. of Cambridge, Mass. These bladders, running cross-wise inside the rubber facing, are positioned between rubber spacers, and are inflated by hand pump through protruding valves. Though the door is only 2½ inches thick, it has high insulation value, a smooth outside surface and so little inertia that the pressure of one finger opens it. The door is suspended on hinges attached to steel strips running along one side. It weighs about 1/3 of the conventional metal-protected swinging doors.

Vinyl Plastisol Modifier

According to the Kenrich Corp., New York, N. Y., the use of Kenflex as a substantial part of the total plasticizer content in vinyl plastisols and organosols is contributing to higher ranges of rigidity and dielectric strength. As a new tool, Kenflex has led to the development of plastisols for wire insulation, potting compounds, printing inks, and coatings. A popular plasticizer combination is reported to be two parts of Kenflex A to one part DOP, giving a high viscosity plastisol, mixed and applied at elevated temperatures. A plastisol containing the product is said to maintain constant viscosity during the preheating period until the fluxing point is approached. It is also claimed that higher tensile strengths and more rapid fluxing are obtained with elimination of excessive "rubbery" characteristics. Bonding, surface finish and the dispersion of fillers and pigments are also said to be improved with the presence of Kenflex.

Dunlop Building Brazilian Plant

The first factory in South America of the Dunlop Rubber Co. is presently being constructed on 200,000 square yards of land near Campinas, Sao Paulo, Brazil. While Dunlop has operated in Brazil since 1913, this will mark its first endeavor into the manufacture of tires and rubber goods in that country. Manufacture will be carried on by a newly-formed subsidiary, Dunlop do Brasil, S. A. Industria de Borracha, with a registered capital of 50,000,000 cruzeiros. Plant and equipment costing the equivalent of nearly $3,000,000 will be installed at the Campinas site, most of it imported from Britain.

Plastic Replaces Canvas

Ordnance materiel will be wrapped in plastic shrouds in the future instead of canvas tarpaulins, according to an announcement made by the Army in Washington, D. C., on October 2. The shrouds, of a vinyl chloride material, have been developed by the Army Ordnance Corps in cooperation with several private companies. The canvas tarpaulins, it was said, are several times heavier and cost several times as much. The shrouds, only eight thousandths of an inch thick, can withstand velocities of 60 miles an hour and temperatures ranging from below zero to 95° F.

Technical Tape Appointments

Technical Tape Corp., New York, N. Y., has announced the appointment of Thomas Taverna as vice-president in charge of production and engineering. Mr. Taverna was formerly associated with the U. S. Army Air Corps. Marc L. Lawson, formerly director of sales for the company and previously affiliated with the Industrial Tape Corp., has been named vice-president and director of sales. Theodore Laux, formerly a professional baseball and football player, has been named vice-president in charge of field sales. Charles Katz, formerly purchasing agent, has been named vice-president and assistant general manager of the company. He was previously associated with the Biddle Purchasing Co. Fred De Hoag, previously eastern sales manager of the Mid-West Abrasive Co., has been named vice-president and administrative executive. Technical Tape recently opened new research laboratories and offices in two buildings at the site of its main plant at the Harlem River and West 177th St., in New York City.

Vinyl Encased Nuts and Bolts

Expensive stainless steel nuts and bolts and special rubber sealing gaskets used in corrosive chemical baths are being replaced by vinyl encased low carbon nuts and bolts by the Industrial Rayon Corp., Cleveland, Ohio. Manufactured by Steere Enterprises, Akron, Ohio, the plastic encased nuts and bolts are used in long narrow tanks, or baths, employed in the rayon manufacturing processes. For this application, a 3/64-inch semi-hard vinyl coating was found to be the most suitable. A year's experience with the nuts and bolts has shown that a permanently liquid tight seal is maintained, and that the coating effectively protects the metal. The plastic vinyl encased nuts and bolts are manufactured by dipping a properly preheated nut or bolt in a vinyl plastisol made from Geon paste resin. The thickness of coating in this process depends upon the amount of preheat, the type of plastisol formulation, and the length of time of immersion in the plastisol.

G-E Silicone Rubber-Glass Cloth

The Laminated and Insulated Products Department, Chemical Division, General Electric Co., Pittsfield, Mass., has announced the production of silicone rubber-treated glass cloth for motor and cable insulation. In the dipping process that is used, glass cloth is passed through a liquid solution of silicone rubber. After the application of heat to cure the rubber, the treated fabric is ready for use. The process is continuous. The chief use of silicone rubber-treated glass cloth at present is for motor and cable insulation, company officials said. Having high heat resistance and excellent flexibility and electrical properties, the material is ideal for these applications. It is anticipated that other uses will be developed in the electric industry, and requirements for defense applications may require substantial quantities. Thirty-six inch widths from four to ten mils in thickness are being produced at the Coshocton, Ohio, plant of the company. Although the combination of silicone rubber with glass cloth was developed several years ago, the important improvements made in silicone rubber formulations in the past year now enable a far superior product to be made which should prove a valuable asset in electric insulating applications.

Entwistle Buys Cranston Plant

James L. Entwistle Co., Pawtucket, R. I., has announced plans for the immediate expansion of the company involving the purchase of the plant of the Standard Machinery Co. in Cranston, R. I., and a 100 to 150% increase in employment. The Cranston plant, with 80,000 square feet of production area and 16,000 square feet of office and engineering space, will be five times the size of the plant the company is presently leasing. Defense contracts held by Entwistle with the Signal Corps were the reason for the expansion. Funds with which to purchase the Standard Machinery plant, make alterations, pay for moving and provide working capital will come from a $620,000 RFC loan approved recently. In addition, the Signal Corps will provide $234,000 worth of equipment. In recent years, Entwistle has developed a complete and almost exclusive line of wire-making and processing machines.

Opens Latin American Office

A Latin American office has been opened in Mexico City, Mexico, by Arthur D. Little, Inc., Cambridge, Mass. The new office will serve as a convenience to the company's growing number of Latin American clients and will also be valuable in conducting surveys and investigations for U. S. clients who are interested in taking part in the rapid industrial and commercial expansion now taking place in many parts of Latin America. The office is headed by Richard W. Plummer, formerly vice-president of E. R. Squibb & Sons de Mexico. He was previously with the Office of Rubber Reserve. The Latin American offices of Arthur D. Little, Inc. are located at Edificio International 963, Reforma 1, Mexico 1, D. F.

Named Executive Vice-President

Leaston J. Howell

Leaston J. Howell, formerly vice-president in charge of operations for the Acme-Hamilton Manufacturing Corp., has been named executive vice-president of the company. The corporation operates the Acme Rubber Manufacturing Co. and the Hamilton Rubber Manufacturing Corp., both of Trenton, N. J. Mr. Howell, who has been associated with the Hamilton company for the past 34 years, was named vice-president in charge of operations for the two plants in 1949. Announcement was also made that Harry C. Burger, vice-president of Acme, has been named to succeed Mr. Howell as vice-president in charge of production at both plants. Ervin W. South, vice-president and sales manager of Hamilton Rubber, has been named vice-president in charge of sales for both plants. Norman J. Cyphers has been named vice-president and technical director for both units while J. Vincent Carlin has been appointed general sales manager of Acme Rubber. Messrs. Howell and South will continue as members of the board of directors of the Acme-Hamilton Manufacturing Corp.

Braze Rubber Bonding Agent

R. T. Vanderbilt Co., New York, N. Y., has introduced "Braze", a new adhesive for bonding natural rubber, GR-S or neoprene to metals. Braze is a free-flowing homogeneous liquid solution of halogenated rubber derivatives of selected types along with the modifying agents required to assure uniformity, stability and satisfactory aging in contact with various metals, the company states. It exhibits a mass-tone of deep ruby color and dries to a readily identifiable burgundy color in the thin translucent film applied to metal for use as a bonding agent. The highest measured adhesion values are generally obtained with top quality black-reinforced stocks having a Shore hardness range of 50-70. The bond strength appears to be a function of the quality of the rubber to a considerable extent, and if high quantities of plasticizers or non-reinforcing fillers are required to impart some specific property to the rubber, a cement of a harder or higher quality compound may be used to improve the adhesion.

WASHINGTON APPOINTMENTS

William C. Truppner, formerly acting as NPA assistant administrator for production controls, has been named DPA assistant administrator in charge of production and distribution controls.

R. Allen Griffin, previously director of the ECA Far East Program Division, has been named special representative to the Far East. Edwin G. Arnold, formerly deputy director of the Far East Program Division, has been named acting director of the division.

Francis J. Curtis, vice-president and a director of the Monsanto Chemical Co., has resigned as assistant administrator of the NPA Chemical, Rubber and Forest Products Bureau. Kenneth H. Klipstein, assistant general manager and head of the Technical Department of the Calco Chemical Division, American Cyanamid Co., has been named to succeed Mr. Curtis.

Lawrence W. Strattner, administrative vice-president of the West Virginia Pulp and Paper Co., has been named deputy assistant administrator of the NPA Chemical, Rubber and Forest Products Bureau.

Osgood V. Tracy, formerly deputy director of the NPA Chemical Division, has been named director of the division. Mr. Tracy is on leave from the Esso Standard Oil Co. where he is general manager of the Chemical Products Department.

Jack W. Askins, previously assistant to the director of the NPA Construction Machinery Division, has been named deputy director of the Materials Division in the NPA Office of Civilian Requirements.

Consolidate DuPont Sales Activities

All sales activities of the Organic Chemicals Department of E. I. du Pont de Nemours & Co., Inc., were brought under one general director on December 1, with Douglas Newman, formerly sales director of the Dyestuffs Division, taking over the new position. Effective the same date, Dr. Miles A. Dahlen became director of sales of the Dyestuffs Division, and Gordon M. Markle became director of sales of the Fine Chemicals Division. H. J. Swezy has been appointed director of sales of the Export Division, and J. Preston Wills has been named manager of export sales. The export business of the entire Organic Chemicals Department has now been put into one sales division for the first time.

Finley Purchases L. W. Dumont

Fred B. Finley, associated with the L. W. Dumont Co., New York, N. Y., natural rubber brokers and sales agents, has purchased control of the company from the widow of the late Richard H. Toeplitz. Mr. Finley, active in the rubber business for many years, joined the Dumont organization on May 7, 1951, as general manager. He will continue business operations of the company as heretofore.

Named Chicago Branch Manager

A. L. Robinson

Harwick Standard Chemical Co., Akron, Ohio, has named A. L. Robinson as manager of its Chicago, Ill., branch office. Mr. Robinson has been technical sales representative with headquarters in Chicago since 1949. A graduate of Akron University with a degree in chemistry, Mr. Robinson was formerly associated with the B. F. Goodrich Co. at Akron, Ohio, and Borger, Texas. He became chief chemist of the GR-S laboratory at the Borger plant in 1945 and was later transferred to the Akron plant as chief chemist on oil-resistant type rubbers. His work also included testing for the rubber development group at the Akron plant where he took an active part in the rubber development program. Mr. Robinson is a member of the Chicago Rubber Group and the American Chemical Society.

Amax Thiazole-Type Accelerator

Amax, a new modified thiazole-type accelerator now supplementing Captax and Altax in the line produced by the R. T. Vanderbilt Co., New York, N. Y., is suggested as a replacement for Altax or other recognized safe processing accelerators. Vanderbilt states that 4 to .5 parts of Amax per 100 of rubber provides adequate acceleration with the fast curing blacks, and that .75 to 1.25 Amax is a satisfactory range in which to work when compounding channel blacks in rubber. Results of road tests on tires made with Amax demonstrate its acceptability as a tread-stock accelerator, and laboratory-conducted oven and oxygen bomb aging studies demonstrate further that Amax accelerated tread-type compounds exhibit most satisfactory physical properties and resistance to flex cracking after aging. Amax can also be used to advantage in highly loaded, hot-processing compounds of which GR-S floor tiling may be considered a representative type, the company states.

Witco Chemical Co., Ltd., has moved from its old address at 101 Baker St., London, W. 1, to larger and more centrally located offices in Bush House, Aldwych, London, W. C. 2, England.

FINANCIAL NEWS

U. S. Rubber Co.

First Nine Months: Net profit of $22,428,879, which is equal to $10.52 a common share, compared with $15,857,158, or $6.79 a common share, in the first nine months of 1950. Net sales for the nine months ended September 30, 1951, totaled $632,700,279, against $487,136,916 in the same period of 1950. Earnings, the report noted, increased 41.4%, sales 29.9%, and tax and renegotiation provisions 24.2% in the 1951 period compared with the 1950 period. Earnings, sales and taxes of the company all set a record in the first nine months of 1951.

Thermoid Company

First Nine Months: Net income of $1,409,539, which is equal to $1.64 a share each on 800,603 shares, compared with $1,068,062, or $1.29 each on 750,000 shares, in the first nine months of the preceding year. Consolidated sales in the nine months ended September 30, 1951, amounted to $30,529,064, against $20,436,501 in the corresponding period of 1950. Sales and earnings for the 1951 period were the largest in the company's history.

United Carbon Co.

First Nine Months: Net profit of $2,703,972, which is equal to $3.40 a share, compared with $2,496,503, or $3.14 a share, in the first nine months of the preceding year. Balance sheet items of the company as of September 30, 1951, show current assets of $12,362,368 and current liabilities of $4,291,149, against $11,536,927 and $2,827,622, respectively, on September 30, 1950.

General Cable Corp.

First Nine Months: Net profit of $3,079,996, which is equal to $1.62 a common share, compared with $1,125,081, or .36¢ a share, in the nine months ended September 30, 1950. Earnings before taxes in the first nine months of 1951 rose to $11,534,996 from the $2,029,080 in the first nine months of 1950.

Cooper Tire & Rubber Co.

First Nine Months: Net profit of $281,008, which is equal to $1.79 a common share on net sales of $13,965,891, compared with $305,964, or $1.95 a share on sales of $8,878,317, in the first nine months of the preceding year.

Sheller Manufacturing Co.

First Nine Months: Net income of $2,412,955, which is equal to $2.18 a common share, compared with $3,398,936, or $3.07 a share, in the first nine months of the preceding year.

B. F. Goodrich Co.

First Nine Months: Estimated net income of $24,500,272, which is equal to $5.75 a common share, compared with $21,967,990, or $5.20 a share in the first nine months of 1950. Consolidated net sales in the first nine months of 1951 totaled $479,956,064, against $389,099,197 in the first nine months of the preceding year. Most of the gain was offset by an increase of nearly 100% in federal income and excess profits taxes, which totaled over $60,000,000 in the 1951 period against $31,000,000 for the first nine months of 1950.

Mohawk Rubber Co.

First Nine Months: Net profit of $833,116, which is equal to $5.88 a share, compared with $2.26 a share in the first nine months of 1950. Sales in the first nine months of 1951 amounted to $15,482,000, a new high and more than double the sales of the same period of 1950 of $7,652,000. Total sales in 1950 amounted to $11,551,000.

Dewey & Almy Chemical Co.

First Nine Months: Net income of $1,043,500, which is equal to $1.14 a common share, compared with $1,421,433, or $1.56 a share, for the similar period of 1950. Sales in the first nine months of 1951 totaled $22,052,698, against $15,482,804 in the first nine months of the preceding year.

Anaconda Wire & Cable Co.

First Nine Months: Net income of $4,097,527, which is equal to $4.86 each on 843,962 capital shares, compared with $2,690,021, or $3.19 each on an equal number of capital shares in the first nine months of the preceding year.

Belden Manufacturing Co.

First Nine Months: Net income of $891,298, which is equal to $2.78 a share on net sales for $18,838,535, compared with $1,121,043, or $3.49 a share, on sales of $15,221,079, in the first nine months of the preceding year.

Okonite Company

First Nine Months: Net profit of $1,051,179, which is equal to $7.39 a common share, compared with $693,987, or $5.00 a share, in the first nine months of the preceding year.

McNeil Machine & Engineering Co.

First Nine Months: Net profit of $960,065, which is equal to $1.92 a common share on sales of $12,320,046. No comparison with the first nine months of the preceding year is available.

ECA-NMC Productivity Mission

A number of leading European representatives participated in the International Management Productivity Mission sponsored by the Economic Cooperation Administration through the National Management Council. The purpose of the mission was to quicken the interchange of knowledge, "know-how," and attitudes underlying manufacturing and distributing methods between European and American businessmen. The complete mission consisted of a two-week program of plant visits starting in New York on November 19. The program ended in Washington, D. C., on November 30, with conferences with various government officials. European rubber company officials attending the meeting included: Niels Aars-Nicolaysen, general manager, A/S Askim Gummivarefabrik, Askim, Norway; Alberto Pirelli, managing director, Pirelli, S.p.a., Milan, Italy; Albert Schafer, chairman, Phoenix Co., Hamburg, Germany, and E. L. C. Schiff, president, N. V. Nes-Amerikaanse Autobandenfab. Vredestein, The Hague, Netherlands.

National Automotive Fibres, Inc.

First Nine Months: Net profit of $3,153,598, which is equal to $3.16 each on 996,145 capital shares, compared with $3,350,562, or $3.36 each on an equal number of shares, in the first nine months of the preceding year. The 1951 figures reflect increased taxes under the 1951 Revenue Act. Previously, the company had reported a net profit of $3,421,357, or $3.43 a share, for the first nine months of 1951.

Minnesota Mining & Mfg. Co.

First Nine Months: Net income of $11,127,754, which is equal to $1.39 a common share, compared with $14,820,590, or $1.87 a share in the first nine months of 1950. Sales in the first nine months of 1951 totaled $126,810,666.

New Jersey Zinc Co.

First Nine Months: Net profit of $7,577,738, which is equal to $3.87 each on 1,960,000 capital shares, contrasted with $5,819,445, or $2.97 each on an equal number of shares, in the first nine months of the previous year.

Monroe Auto Equipment Co.

Year to June 30: Net income of $697,093, which is equal to $1.63 a common share on net sales of $17,324,989, compared with $475,198, or $1.04 a share, on sales of $12,272,206 in the previous fiscal year.

Mohawk Rubber Co.

First Nine Months: Net profit of $833,116, which is equal to $5.88 a common share on sales of $15,482,000, compared with $319,665, or $2.26 a share on sales of $7,652,000, in the first nine months of 1950.

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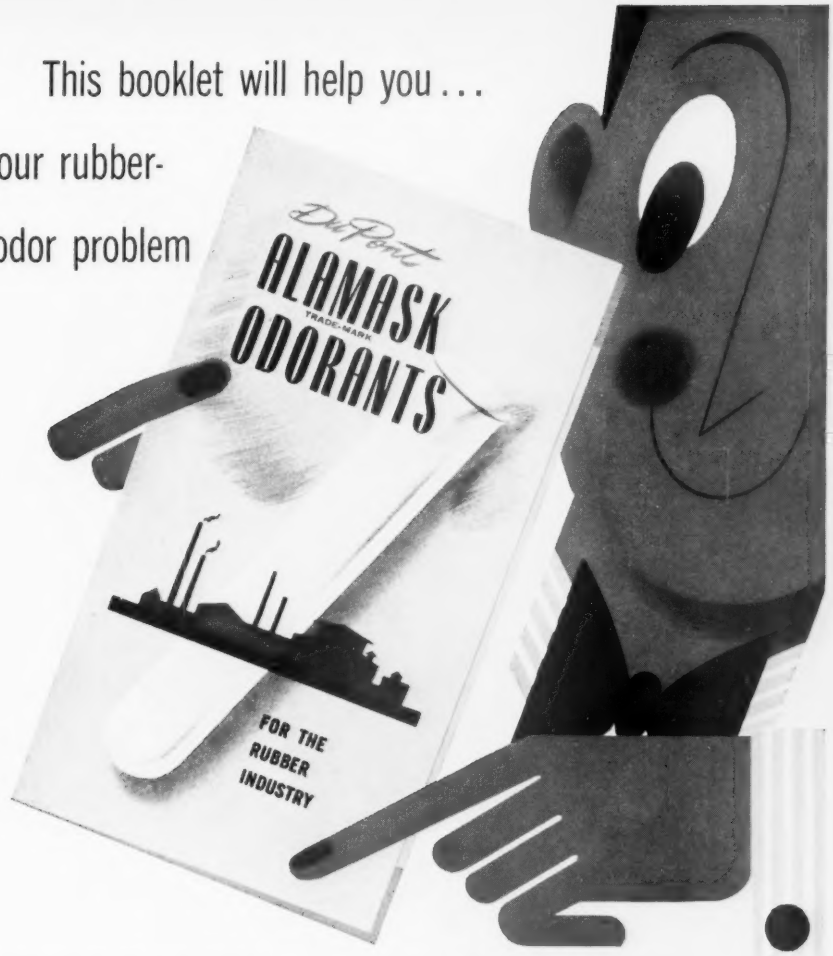

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Named Amertex Vice-President

H. B. "Hap" Morris

Amertex Manufacturing Corp., New York, N. Y., has appointed Harold B. "Hap" Morris as vice-president in charge of operations. Amertex is a subsidiary of the Gerry Nufoam Products Corp. of New York. Mr. Morris formerly served as technical director for the Eagle Rubber Co., Ashland, Ohio, and previously was associated with the Killian Manufacturing Co., Akron, Ohio. Known as an authority on rubber production and latex formulas and processes, Mr. Morris is Phi Beta Kappa and a graduate of Gettysburg College where he received his bachelor's degree in chemistry. Later, he did graduate work at Akron and Johns Hopkins Universities. From 1931 to 1939 Mr. Morris was associated with the Firestone Tire & Rubber Co. in Akron and the Firestone Rubber & Latex Products Co. at Fall River, Mass. He later was appointed New England technical sales representative of the Naugatuck Chemical Division of the U. S. Rubber Co. on latex and compound latices. During World War II, Mr. Morris held the rank of captain in the Chemical Warfare Service of the United States Army. In announcing Mr. Morris' appointment, it was also announced that Amertex is planning an expansion of its facilities which will result in a doubling of capacity.

Fisher Joins RFC Rubber Group

Harry L. Fisher, formerly associated with U. S. Industrial Chemicals, Inc., and who recently acted as executive secretary of the 12th International Congress of Pure and Applied Chemistry which was held in New York, has joined the Synthetic Rubber Division, Office of Production Management, Reconstruction Finance Corporation. This is the division which recently took over the activities of the Office of Rubber Reserve. Dr. Fisher, who has been a consultant on the government rubber program since 1942, will act as special assistant on research and development matters. Among other honors, Dr. Fisher is the possessor of the Charles Goodyear Medal.

Monsanto Chemical Sulfasan R

Sulfasan R, an organic sulfur-containing compound to replace elemental sulfur in natural and synthetic rubber furnace black stocks, is now available in commercial quantities from the Monsanto Chemical Co., St. Louis, Mo. The compound, 4,4'-dithiodimorpholine, was developed by the company's Rubber Chemicals Department to reduce scorch or prevulcanizing which occurs in high modulus and high abrasion furnace black stocks when free sulfur is used as a vulcanizing agent. Sulfasan R is said to delay the scorch time over free sulfur two- to three-fold at processing temperatures of 135° C. Yet, it is said to give equally high modulus and tensile values at vulcanizing temperatures of 145° C. and also imparts aging characteristics to rubber stocks containing furnace blacks. The total sulfur content of rubber stocks containing Sulfasan R is less than half that required to obtain equivalent cured physical properties when using free sulfur: 2.5% sulfur compared with 0.7 to 1.0% sulfur equivalent in Sulfasan R. Sulfasan R was selected as the most promising of 17 N,N'-dithioamines investigated because of its ease of preparation, raw material costs, physical form and scorch and cure characteristics. The compounds were tested with various furnace blacks and accelerators.

Wabash Division in Operation

The new Wabash Division of Raybestos-Manhattan, Inc., at Crawfordsville, Ind., has begun operations for the manufacture of sintered metal products for the defense program. Two units have been built on a 62-acre tract—a main building which contains the manufacturing facilities and administrative offices and a service building which houses the power plant with boilers, compressors, water softeners and an electric power center. The company plans to expand the division over a period of years to encompass the manufacture of rubber products including fan belts, packings, industrial rubber products, etc. John H. Matthews, vice-president of Raybestos-Manhattan, is in charge of the new division, and Clarence P. Schneider, formerly located at the Passaic plant, has been named factory manager at Crawfordsville.

Elastomer Group Plans Meeting

The Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society will hold its next two meetings at the Massachusetts Institute of Technology, Cambridge, Mass. At the meeting of December 20th, Andrew Mitchell of the technical staff of the Rubber Laboratories, E. I. du Pont de Nemours & Co., Inc., will deliver a talk on "Neoprene Solvents." The January 17, 1951 meeting will be addressed by Dr. John T. Blake, director of research for the Simplex Wire & Cable Co. Dr. Blake will speak on "Wire Coating Techniques and Compounds."

Andruss Joins General Latex

Frank D. Andruss

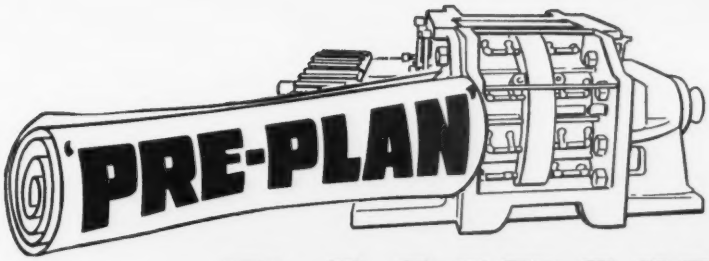
Frank D. Andruss, formerly associated with the General Services Administration where he served as chief of the Latex Branch, Rubber Division, Emergency Procurement Service, has joined the General Latex & Chemical Corp., Cambridge, Mass., as general sales manager. Raymond E. Nelson will continue as sales manager of the Compound Division, and Henry G. Brousseau as technical sales manager. Mr. Andruss is a graduate of the Yale Sheffield Scientific School. With the exception of a period during World War II when he served as a Lt. Commander in the U. S. Navy, he was employed by the Charles T. Wilson Co., Inc., as manager for their Latex Department. In the summer of 1950, Mr. Andruss made an extensive trip through the rubber producing areas of the Far East, and England and Holland.

Vopcolene Names Sales Agents

Vopcolene Division of the Vegetable Oil Products Co., Inc., Los Angeles, Calif., has named the B. F. Dougherty Co. as national sales distributor for Vopcolene products to the rubber industry. B. F. Dougherty maintains its principal office at 1807 E. Olympic Blvd., Los Angeles 21, and branch offices in San Francisco, Akron, Ohio and other important consuming centers. The division has also announced that the Lotte Chemical and Dye Corp. of Paterson, N. J., will handle east coast representation. Sales to the Pacific Northwest will be handled by W. Ronald Benson, Inc., 558 First Avenue South, Seattle, Wash.

Receive Army Department Awards

Arthur H. Nellen, vice-president of the Lee Tire & Rubber Corp., Dr. J. N. Street, director of the chemical laboratories of the Firestone Tire & Rubber Co., and Dr. B. S. Garvey, Jr., manager of the sales service laboratory of Sharples Chemicals Inc., were recently honored by the Department of the Army for contributions to the World War II effort in industrial intelligence. A certificate of Appreciation, signed by Frank Pace, Jr., Secretary of the Army, was presented to each of the award winners.



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PLANTS AT ALLIANCE & AKRON

CANADIAN NEWS

Cabot Carbon of Canada, Ltd., Sarnia, Ont., has announced the immediate construction of a new 20,000,000 pound capacity oil furnace carbon black plant of ultra modern design. Representing an investment in excess of $2,000,000, the enterprise will be under the direction of Louis W. Cabot, vice-president of the company. Contract for the construction of the plant has been awarded and preparation of a 15-acre site near Polymer Corporation's synthetic rubber units is in progress.

The U. S. dollars now required for carbon black imports will be reduced by about $2,000,000 after the initial units of the new plant are in full production. The plant will be completed as early in 1952 as priorities granted by the government will permit. Cabot Carbon of Canada will produce primarily HAF. Provision also will be made for the manufacture of FEF and other types as needed by the rubber industry. Raw materials for the production initially will come from refineries in the United States until the rapidly expanding Canadian refinery industry is able to supply the proper quality and type of highly aromatic liquid hydrocarbons.

When completed, the plant will employ from 50 to 60 people, utilizing Canadian personnel to the greatest possible extent. At the outset, some of the key technical positions will be manned by specialists from Godfrey L. Cabot, Inc. Louis Cabot, recently recalled from England where he was in charge of construction and operations of the Cabot Carbon, Ltd., plant at Ellesmere Port, will direct the construction and operation of the new plant.

The great importance of phenol to Canada's rapidly expanding industrial economy was underlined recently by the announcement that the Canadian Kellogg Company, Ltd., a subsidiary of the M. W. Kellogg Company, refinery and chemical engineering-contracting firm of New York City, has been awarded a multi-million dollar contract for a unique phenol plant at Montreal for B. A. Shawinigan, Limited, a new company jointly owned by the British American Oil Company and Shawinigan Chemicals, Limited.

According to Kellogg, the new plant, which will produce 13 million pounds of phenol annually, will be the first commercial unit of its type. It employs a process under license from the Hercules Powder Company of Wilmington, Delaware, and Distillers Limited, London, by which cumene, a petroleum derivative, is oxidized to produce both phenol and acetone. Cumene will be piped from the Montreal refinery of the British American Oil Company.

Both phenol and acetone, upon completion of the unit, will be available for sale to Canadian industry and for export. Both are used in the manufacture of plastics and many other commercial products.

Members of the 25-Year Club of Gutta Percha & Rubber, Ltd., meeting recently in Toronto, Ont., heard W. O. Simpson, president, state that during the first six months of 1951 Gutta Percha goods went to 26 different foreign countries. The increase in export business, he said, does not include business handled from London. Business appears to be slowing down at present, he said, but this appears due to temporary conditions caused by credit restrictions and inventory adjustments. Mr. Simpson said the company's balance sheet, at depreciated values, shows that $9,100 has been invested to provide a job for each employee. "If the company were to replace the facilities it now uses, it would require an investment of $17,600 for each employee," he asserted.

Courtaulds Canada, Ltd., has approved a program designed to double the firm's existing capacity for the production of viscose rayon tire yarn and staple fiber. The projected expansion program, according to company officials, will make Canada virtually self-sufficient as far as these two textile products are concerned. At present, the company produces 12,000,000 pounds of staple fiber and 10,000,000 pounds of tire yarn annually. Current expansion projects will raise this figure during 1952 to 17,000,000 pounds of staple fiber and 14,000,000 pounds of tire yarn. The new expansion, expected to be completed not later than 1953, will bring its annual capacity to 24,000,000 pounds of staple fiber and 22,000,000 pounds of tire yarn.

Edward W. May and James C. E. Fuller have been appointed sales representatives of industrial chemicals for Naugatuck Chemicals, a division of the Dominion Rubber Co., Ltd., at Elmira, Ont. Mr. May started with Dominion Rubber in 1940. He will represent the company in the industrial chemical field in the Province of Quebec, with headquarters in Montreal. Mr. Fuller started with Naugatuck Chemicals in 1947. He will represent the company in Western Ontario with headquarters at Elmira.

Kenflex A in Butyl Compounding

Outstanding results on ease of processing of Butyl compounds is obtained through the use of Kenflex, according to an announcement by the Kenrich Corp., New York, N. Y. Use of ten parts of Kenflex A on the Butyl results in compounds which possess molding and extruding characteristics comparable even to polyethylene, it is claimed. In addition, it is reported that such addition of Kenflex to Butyl does not change initial corona, power factor (4,000 hours @ 115° C.), or resistance to ozone.

Schor Named Sales Manager

Andrew Schor

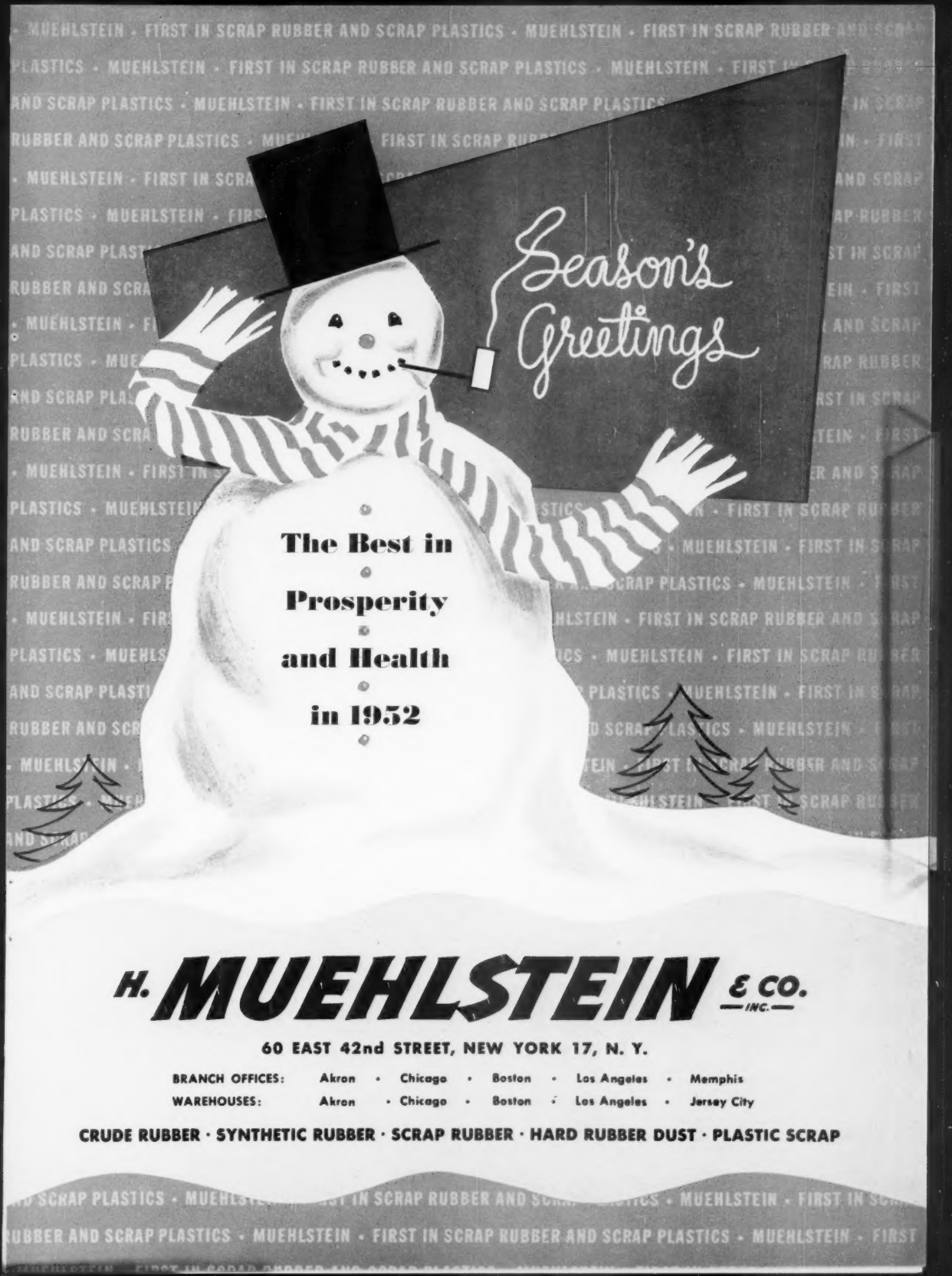
Velsicol Corp., Chicago, Ill., has appointed Andrew Schor as sales manager of its Resin and Solvents Division. Prior to his appointment, Mr. Schor was head of the Technical Service Division. He has been associated with the Velsicol Corp. for the past six years and began his employment as a development chemist. Mr. Schor was graduated from the University of Chicago with a master of science degree in chemistry and served in World War II.

Ridgway Named Research Director

Eric O. Ridgway has been appointed director of research and development of the Thermoid Co., Trenton, N. J. Mr. Ridgway served as assistant to the president of a New Jersey rayon manufacturing concern before forming his own chemical research company in 1936. In partnership with others, he later formed Ridbo Laboratories at Paterson, N. J. Thermoid has acquired controlling interest in Ridbo, including patents on rubber compounding materials, drying oil properties and rosin acid derivatives used in synthetic rubber. A native of South Africa, Mr. Ridgway was educated in South African, English and American schools. Company officials stated that emphasis of research and development under Mr. Ridgway will be in the chemical field.

T. D. Cabot Named Vice-Chairman

Godfrey L. Cabot, Inc., Boston, Mass., has announced the election of Thomas D. Cabot as vice-chairman of the board of directors and executive vice-president. Dr. Godfrey L. Cabot was re-elected president and chairman of the board, and Ralph Bradley was re-elected treasurer. Thomas Cabot withdrew from active direction in the affairs of the Cabot companies in the early part of this year to assume the duties of the director for International Security Affairs of the United States Department of State. This is an interdepartmental agency responsible for coordinating the government's foreign and military aid programs. He has now severed his official connection with the government and will return shortly to his offices in Boston.



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LOS ANGELES NEWS

The November 6th meeting of the Los Angeles Rubber Group was sponsored by the Ohio Rubber Co. and featured an address by Dr. Ira Williams, technical director of the J. M. Huber Corp. Dr. Williams spoke on the more theoretical aspects of compounding rubber. A full report on his talk will be found elsewhere in this issue.

At the regular meeting, chairman R. D. Abbott read excerpts from a number of letters received from men of note in the rubber industry commending the group on its efforts to establish the TLARGI Educational Foundation. Dean Thomas, general manager of the Ohio Rubber Co., took this occasion to present to TLARGI a donation of $2,500 for the Educational Fund. Mr. Abbott also revealed that the Plastic & Rubber Products Co. had contributed another $2,500. At the present moment, donations to the fund total $21,500.

L. E. Budnick, assistant treasurer and assistant secretary of Ohio Rubber, introduced the speaker of the evening, Bob Ringer, who gave an interesting talk stressing the value of a sense of humor in everyday living. E. C. McLaughlin, chairman of the Nominating Committee, revealed the slate of candidates for 1952 officers and directors. These are:

Chairman, R. L. Short (Kirkhill Rubber); *Associate Chairman*, D. C. Maddy (Harwick Chemical); *Vice-Chairman*, L. E. Budnick (Ohio Rubber) and Roy Phelan (Atlas Sponge Rubber); *Secretary*, Ray Bitter (Goodrich Chemical) and Al Federico (C. P. Hall); *Treasurer*, W. M. Anderson (Gross Mfg.) and F. C. Johnston (Caram Mfg.).

Directors, R. E. Behrman (U. S. Rubber), R. L. Bowen (Xylos Rubber), W. E. Boswell (Thickol), C. H. Kuhn (Master Processing), J. B. Larkin (Patterson-Ballagh), H. Libkind (Western Insulated Wire), G. W. Miller (W. J. Voit), D. M. Sheppard (Goodyear) and R. B. Stewart (Dow Corning).

Winners of prizes at the November 6th meeting included the following: *Door Prize*, Walter Field (Irvington Varnish); *Raffle Prizes*, Floyd Price (W. J. Voit), Irvin Seegman (Products Research), Fran Beiter (Golden West Rubber), Lou Weidman (California Rubber), Joseph J. Stetina (Tri-Angle Tool) and Glen Dunbar (Caram Mfg.).

The Educational Committee of TLARGI has announced that a course in Rubber Technology II will be given at Los Angeles City College beginning February 2, 1952. This course is an advanced course as compared with the course which has been offered. It will be under the direction of John Ryan of the Technical Department of the Goodyear Tire & Rubber Co. Persons wishing to register for the course are urged to apply as soon as possible.

J. A. "Scotty" Davidson, master mechanic at the Los Angeles plant of the Goodyear Tire & Rubber Co., died while on a trip to Catalina Island on October 3. He started with Goodyear in Canada, later moving to Akron where he became foreman of the repair gang. In 1920, Mr. Davidson came to California in charge of installation of all heavy equipment in the plant. He took over his position as master mechanic in 1923. Mr. Davidson was a native of Scotland.

Willard Wikoff, maintenance engineer at the Los Angeles plant of the B. F. Goodrich Co., was recently elected president of the plant's 20-Year Club.

United Rubber Corp. is constructing additional warehouse facilities at its plant site in Los Angeles. The new unit consists of a 4,000 square foot concrete block building with a 13-foot ceiling clearance to permit handling of raw material on pallets.

Fred P. Benoit, formerly associated with the Bean Rubber Manufacturing Co. at San Jose, Calif., has severed his connection with that company and formed the Alco Rubber Manufacturing Corp., 1800 Williams St., San Leandro, Calif. J. D. Flynn is president of the new company while Mr. Benoit is vice-president and general manager. The firm will produce specialty molded goods and some extrusions.

Norman K. Lillis, formerly purchasing agent for the Chrysler Corp. at Los Angeles since 1948, has been named general manager of Reeves Rubber, Inc., at San Clemente, Calif.

Dan Budnick, formerly associated with the Kirkhill Rubber Co., has joined the Sierra Rubber Products and Engineering Co. at Inglewood, Calif., in a sales capacity.

Jack Knudsen, previously associated with Kirkhill Rubber, has gone into business for himself as a partner in the firm of Denny and Bates, Los Angeles.

Harold Samson has purchased the stock of his ex-partner Ray Hansell in the Fargo Rubber Corp., and is now sole owner of the company.

George R. Aldrich, formerly associated with Northrup Aircraft, has joined Rubber Teck, Inc., Gardena, Calif., as chief engineer.

J. W. Way, formerly development engineer of the Athletic Ball Division of the Sun Rubber Co., has accepted a similar position with the W. J. Voit Rubber Corp., with whom he was previously associated. Mr. Way had been with Sun Rubber for the past three years.

J. C. Plant, formerly associated with the Bishop Conklin Co., Division of Davoe and Reynolds, has succeeded George Foss as sales representative for the C. K. Williams Co. Mr. Foss has been transferred to the Emeryville office of the company.

Extruders, Inc., Culver City, Calif., has been sold by J. C. Ballagh and R. C. Kress to William Towne of the Pioneer Rubber Mills, San Francisco, Calif. Mr. Ballagh continues as a director of the company. Mr. Towne will serve as president of Extruders, Inc.

Seiberling 30th Anniversary

Seiberling Rubber Co. celebrated its 30th anniversary on November 15 with a party co-sponsored by the company and its 25-Year Club. The celebration was held in the Mayflower Hotel, Akron, Ohio. Forty Seiberling employees who joined the company in its first three months of operation, and are still on the payroll, received special tribute during the ceremony. They received awards from president J. P. Seiberling including a silver 30-year plate for their 25-year award plaques and a total of four weeks' paid vacation in the anniversary year. One new member was inducted into the 25-Year Club, namely, Harry P. Schrank, vice-president in charge of production, who joined Seiberling on November 15, 1926, as a tire designer. Mr. Seiberling thanked the group for their long service to the company and stated that while the firm started operations in the 330th position in the rubber industry, it now is in the top 10. Although the threat of war makes the future unpredictable, he said, the rubber industry is one of the soundest in the nation and will continue to grow.

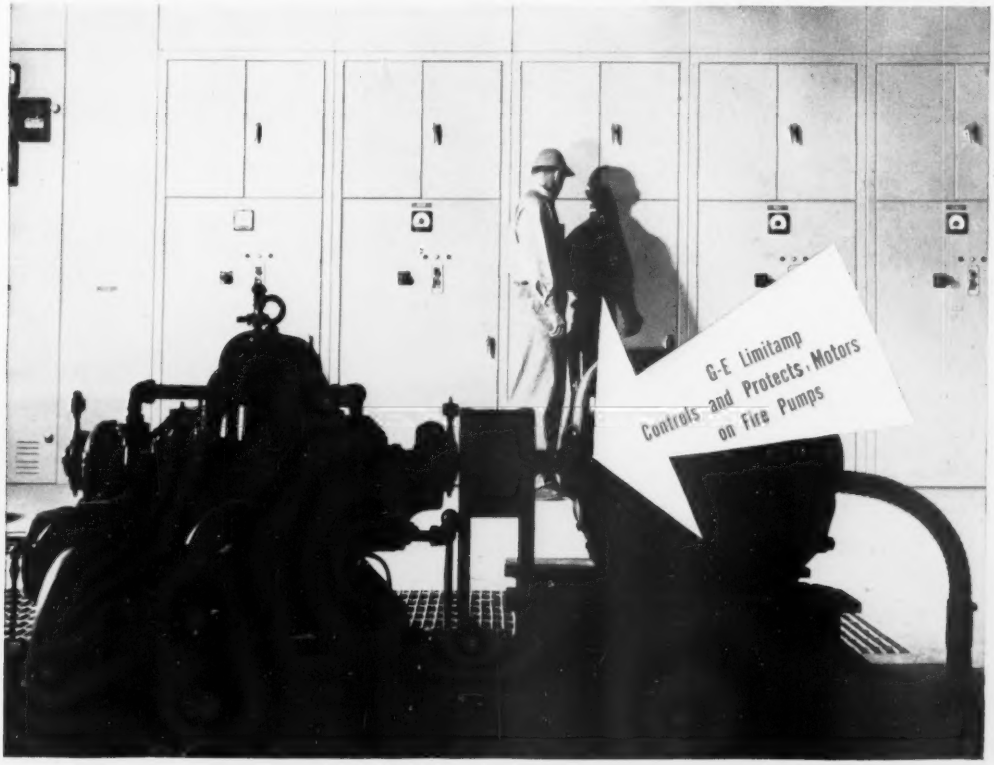
Metal Trade Group Elects Officers

Charles S. Craigmile, president and director of the Belden Manufacturing Co., Chicago, Ill., was elected president of the National Metal Trades Association at the 52nd annual convention of the association held on November 15 at the Blackstone Hotel in Chicago. Also elected were Earle S. Day, vice-president and general manager of the Collyer Insulated Wire Co., Pawtucket, R. I., first vice-president; and Norman L. Rowe, vice-president of the Ideal Roller and Manufacturing Co., Chicago, Ill., second vice-president and treasurer.

Acushnet Process Stock Offering

Paine, Webber, Jackson & Curtis, New York, N. Y., are presently offering 30,800 shares of Acushnet Process Co. common stock at $14.50 a share. The offering does not constitute a new issue. Certain stockholders of the company are selling a minor portion of their holdings in order to establish a public market for the company's securities. Acushnet Process Co. maintains its headquarters and a plant at New Bedford, Mass.

TWO-WAY PROTECTION AT INTERNATIONAL



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GENERAL ELECTRIC

730-28

OBITUARIES

John W. Thomas

John W. Thomas, former president and chairman of the board of the Firestone Tire & Rubber Co., died at his home in Akron, Ohio, on November 26. He was 71 years old.

Mr. Thomas was a chemist and founded the tire company's research and testing laboratories in 1908, when industrial and scientific research was not too widely accepted. His successful innovations won him election to the company's board of directors in 1919. He became a vice-president in 1919 and in 1932 succeeded the late Harvey S. Firestone as president.

He became chairman of the board in 1942 and retired four years later. He was replaced by Harvey S. Firestone, Jr. He was named honorary chairman, however, and kept regular hours at his office as a consultant.

In 1945 Mr. Thomas received the gold medal of the American Institute of Chemists in recognition of his work in rubber research and in the development of synthetic rubber.

The son of an Ohio farmer, Mr. Thomas worked his way through Buchtel College, now the University of Akron, where he was president of his class and captain of the football team. After graduation, in 1904, he was employed by a rubber compounding laboratory in Akron. His work there, and his scholastic record, attracted the attention of Mr. Firestone, who was looking for a chemist to start a laboratory in the tire company he had founded eight years earlier, and which was expanding rapidly with the beginning of the automobile industry. Mr. Thomas set up shop in a corner of the tire plant, and from that time on chemical engineering became a vital part of the concern's operations.

In 1919 Mr. Thomas was elected to the board of trustees of the University of Akron and became chairman of the board in 1926. During the years he held this post, before retiring in 1942, the university's enrollment jumped from 827 to 5,291. He also served many years on the board of the Akron City Hospital and was a member of the Society of Automotive Engineers, the Firestone Country Club and the Portage Country Club.

Funeral services were held on November 28 at the West Hill Congregational Church in Akron. He is survived by his wife, two sons and three daughters.

John S. Merritt

John S. Merritt, a vice-president of the Interchemical Corp., and factory manager of its Standard Coating Division plant at Buchanan, N. Y., died of a heart attack on November 15. He was 52 years old. He had been associated with Interchemical for the last 35 years.

Alfred J. Cawse, Sr.

Alfred J. Cawse, general operating superintendent for the S. S. White Dental Manufacturing Co. in Staten Island, N. Y., died on November 18 in Richmond Memorial Hospital, Prince Bay, Staten Island. He was 71 years old. With the concern for 56 years, Mr. Cawse had been general operating superintendent since 1928. Mr. Cawse was noted in tennis, a sport he took up after he was thirty. He won the National Veterans Singles championship at Forest Hills, a tournament open to men 45 years or older, in 1925, 1926 and 1927. In 1922, he reached the finals of the Metropolitan Clay Court Championship. He was for many years a director of the Eastern Lawn Tennis Association. Mr. Cawse was born at sea aboard a clipper ship of which his English father was captain. A veteran of World War I, he was a member of the American Legion and the Masonic order. He leaves his wife, his son, Alfred J. Cawse, Jr., assistant district attorney of Richmond County, N. Y., and a daughter. Funeral services were held on November 21 at the Bedell Funeral Home in Staten Island.

L. Walter Lissberger

L. Walter Lissberger, manufacturer, inventor and promotor, at one time associated with the rubber manufacturing industry, died on November 13 at Norwalk Hospital in Norwalk, Conn., at the age of 75. Born in Chicago, Mr. Lissberger became affiliated with the rubber industry about 1925 when he bought into the old Keystone Tire & Rubber Co. The company, located in the New York area, featured such tire brands as Keystone, Savoy, Tension-Tested and Metropolitan. He was also associated with the Malcolm Tire Co., which had a very short existence. Mr. Lissberger was also interested in the development of synthetic rubber. In recent years he was associated with the Microstat Corp., which is engaged in the microfilming of documents. Two daughters and a son survive.

Alfred B. Conway

Alfred Bentz Conway, division manager of the Dunlop Tire & Rubber Corp., died on November 7 at his home in Wyncote, near Philadelphia, Penna. He was 64 years old. Mr. Conway, who was with Dunlop for more than 25 years, was associated also with his son, Alfred B., Jr., in the Latex Foam Cushioning Co., distributors of foam rubber products. Mr. Conway, Sr., was a Mason and an Artisan and a member of the Manufacturers Country Club and the Wyncote Men's Club. Services were held on November 10 in Philadelphia. His wife and his son survive.

F. J. Shook

F. J. Shook, machine designer for the National-Standard Co., Niles, Mich., died on October 31 at the age of 69. Mr. Shook was a self-trained engineer, having served his early years with the Morgan Engineering Co. at Alliance, Ohio. In 1918, Mr. Shook joined the B. F. Goodrich Co. and was assigned to the development of tire building machines under John R. Gammeter. He was responsible for the design of several of the early Goodrich fabric and cord tire building machines which were extensively licensed throughout the tire industry. Leaving Goodrich, Mr. Shook went with the Banner Machine Co., Columbiana, Ohio, now a part of the National Rubber Machinery Co. Mr. Shook continued to invent numerous developments to tire building machines, many of which are still in daily use. In 1931, he became associated with the National-Standard Co., manufacturers of tire bead wires. Here, Mr. Shook designed many processing machines for the production of braid and tapes for tire beads. He developed the well-known FSW Bead Machine, one of the first automatic machines employed in the tire industry. This machine is still used in almost every tire plant in the United States and many are installed abroad.

Theodore P. Walker

Major Theodore Penfield Walker, chairman of the board of the Commercial Solvents Corp. and a director of the Corn Products Refining Co., died on November 29 in an ambulance on the way to Roosevelt Hospital in New York City. He was 65 years old. Born in Penfield, Ohio, he received his B.S. at Drury College in 1908 and an LL.D. from the same institution in 1939. He joined the American Forces during the first World War, advancing through the ranks to become a major. He joined Commercial Solvents in 1922 as executive vice-president and a director. He was elected president in 1938 and served until 1947, when he was named board chairman. Major Walker was also chairman of the board of the Thermatomic Carbon Co. He belonged to many scientific and fraternal organizations. He leaves his wife.

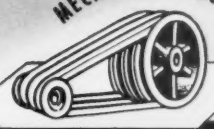
John Bowles

John Bowles, production superintendent of the Latex Division of the Pioneer Latex & Chemical Co., Middlesex, N. J., died on November 20 in Dunellen, N. J., of a heart complication. He was 49 years old. A native of Maryland, Mr. Bowles had spent his entire business career in the rubber industry of northern New Jersey. During his career, Mr. Bowles had been associated with the Flintkote Co. in their laboratory. Later, he advanced to production manager of the Flintkote plant at Whippany, N. J. He was briefly associated with the Continental Can Co. and Dumont Laboratories and at the end of World War II joined Pioneer Latex in charge of latex production. He held this position until his death.

RUBBER MATS

PARADENE
NEVOLL
R-16

MECHANICAL GOODS



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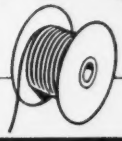

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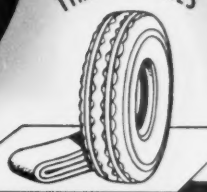
TIRES & TUBES



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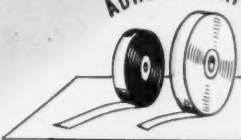
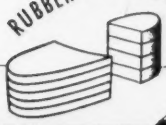


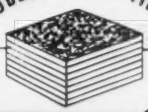
PARADENE
R-17 • R-19 • R-29

RUBBER SOLES & HEELS



PARADENE
R-12 • R-16 • R-16[A]

RUBBER FLOOR TILE



R-12 • R-16
LX-685

• Products listed are all coumarone resins except Nevoll and X-1 Resinous Oil

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Chemicals for the Rubber Industry

R-40

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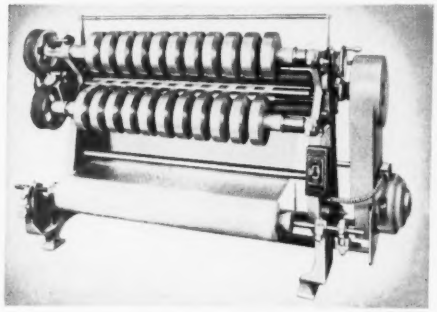
NEW EQUIPMENT

Beck Slitter and Rewinder

To keep pace with modern materials development, the Charles Beck Machine Corporation has redesigned its Beck Razor Blade Slitter and Rewinder for increased versatility of performance. New features are said to greatly enhance the machine's efficiency in converting many materials, including rubber and plastics, into rewound rolls of any width.

Chief among the improvements incorporated in the redesigned unit are wholly remodeled blade holders

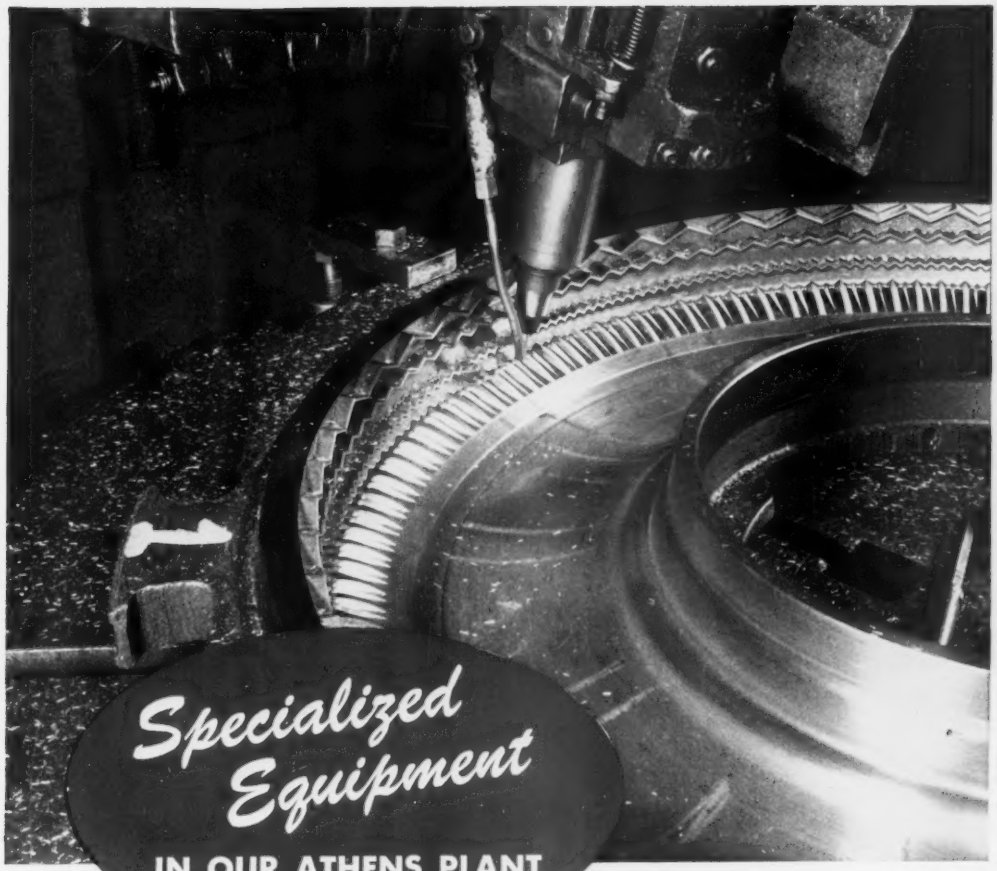


which make possible the changing of razor blades in a matter of seconds. A single snap-fastener secures the blades and changes need not disturb the holder setting for width. Another improvement is a new blade setting gauge which practically doubles set-up speed. By aligning each blade on the cutting roll with the predetermined gauge setting, accuracy of width is achieved for every rewind.

Still another improvement is a simplified method of adjusting the time-proven individual web tension rewind with collars at the end of the rewind shafts. This exclusive feature is said to assure uniformly correct rewind tension by automatically adjusting the action of each rewind core to variations in parent roll thickness. Available, too, with the improved unit is a newly-designed reverse rewind drive which allows rewinding with either web surface outside.

New among the many slitter attachments supplied by the company is the trim blower. This arrangement, available at extra cost, channels trim into users' waste bins when lightweight materials lack sufficient body to drop away from the machine. Thus, the hazards of narrow and possibly static-filled trim are efficiently removed. Use of the attachment also makes possible slightly narrower trim. Static eliminators can also be supplied with the improved unit.

Full details concerning the many improvements now incorporated in this slitter and rewinder are contained in a new catalog. Copies of the catalog can be secured by writing Dept. R, Charles Beck Machine Corp., 414 North 13th St., Philadelphia 8, Penna.



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Economical tire mold manufacture requires special techniques, special tools and tooling. Accordingly, when we consolidated all our tire mold manufacturing in our Athens Machine Division Plant, we installed special purpose equipment built to produce tire molds only. Many of these machines are of our own design.

This adequate and balanced line of equipment devoted to a single purpose makes possible savings in production costs and production time of real importance to tire manufacturers.

Our Athens Machine Division is a completely self-contained tire mold manufacturing plant — the only plant in the world, we believe, devoting itself exclusively to the manufacture of tire molds.

1952

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FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

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- **Maximum Output**
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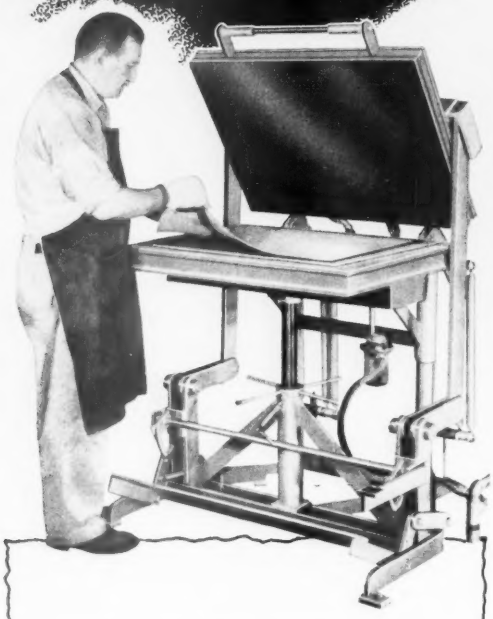

One man can operate from 1 to 17 simultaneously-- depending on curing time

★ Operator fatigue is practically nil with the Holmes Sponge Rubber Vulcanizing Press. Mold remains set--not necessary to lift it each time. Press is opened and closed by counterbalanced foot levers--no effort, no exertion, no fatigue. Consequently--one man multiple press operation is obtained at minimum labor cost. And the initial investment is--1/5 the cost of any other press that will do the same work as efficiently.

WRITE OR WIRE FOR SPECIFIC DETAILS—regardless of your particular requirements. With 50 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, as they have for so many others. No obligation, of course.

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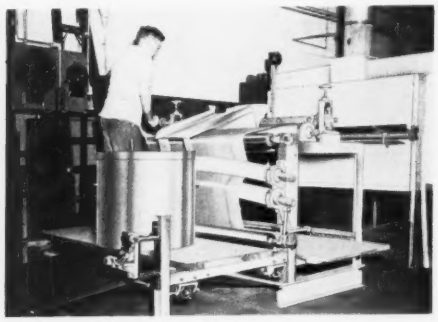
Mount Hope Slack Selvage Eliminator

The slack selvage eliminator introduced by the Mount Hope Machinery Co., of Taunton, Mass., for application on shearing machines has recently found a new application in the coating industry. Slack selvages are a serious problem in coating, causing uneven coating,



slowdowns in production and second grade material. The Coated Products Division of the Interchemical Corporation, at Buchanan, N. Y., was faced with this problem in coating nylon to make poncho material under government contracts, which was quickly solved by incorporation of one of the Mount Hope slack selvage eliminators. The eliminator consists of a brass spring tension pivoted idler roll that takes up the slack on either selvage of material being handled and two "free wheeling" expanders that spread out and hold the material smooth and flat as it enters the coating head on a coating unit. The accompanying photograph depicts a typical installation of the eliminator device at the Interchemical plant at Buchanan.

Merry Christmas!

SEE PAGE 282

Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged—for measuring temperature of mold cavities and flat surfaces, still or moving rolls, and within-the-mass temperature of materials in a plastic or semi-plastic state. Write for Bulletin 194-SA; 33 illustrations, many rubber applications.

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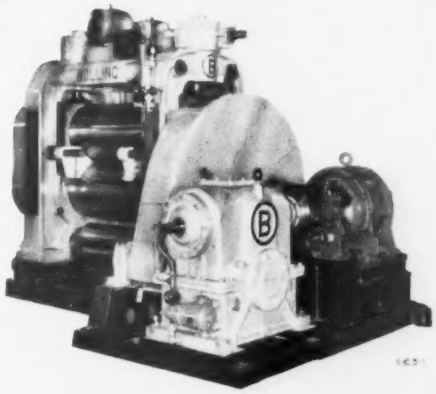
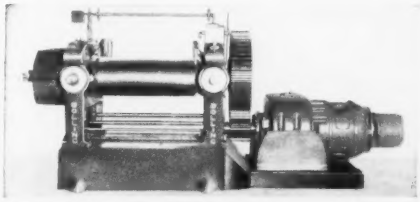
At right—
22" x 50" 2-roll crepe calender

Below—
16" x 42" Pacemaker mill





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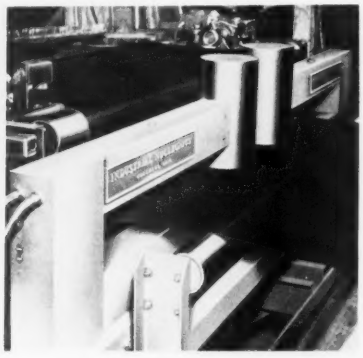
Model R AccuRay Beta Gauge

Designed specifically for continuous measurement of moving materials being calendered in the rubber and plastic industries, the AccuRay Beta Gauge, Model R, has been announced by Industrial Nucleonics Corporation, Columbus, Ohio. Like the original Model BG-1 Beta



Ray Gauge introduced to industry earlier this year, the AccuRay Model R is a non-contacting radiation gauge that provides readings directly in square yard weight with a continuous accuracy of ±1%.

New features of the AccuRay include an automatic control for positioning the measuring unit across the sheet to provide profile readings and a control for the selection of desired weight ranges. Another Model R development is the remote control station with repeat meter which permits the calender operator to read and control the gauge from a distant point. Of further aid to the operator is the AccuRay recorder which can be equipped with target and tolerance marking pens to provide him with a comprehensive working picture at a glance. Also available are chart marking pens for recording the weight range and the sheet position of the AccuRay. This provides management with a permanent record for each roll of processed material. The AccuRay measuring unit is produced in size to permit measurements up to 24, 36, 48, and 60 inches from the edge of the sheet.

Basically, the gauge consists of a beta radiation source below the sheet to be measured and above it a detector to measure the amount of radiation that penetrates the sheet, plus a recorder to present this information in terms of weight per unit area. The AccuRay is insensitive to temperature variations, line voltage fluctuations, dirt, moisture, shock and vibration. It is the only gauge of its type that never requires recalibration.

The accompanying photograph depicts twin AccuRay Beta Gauges installed on a calender unit at the plant of the Gates Rubber Co. in Denver, Colorado.

Designed to replace old-style wooden trucks, a new **all-steel medium duty trailer** has been developed by the Market Forge Co., Everett, Mass. The new trailer is said to be suitable for handling bagged material or to carry one or more pallets loaded with bagged material. It has a capacity of 3,000 pounds,

MOLDS AND DIES

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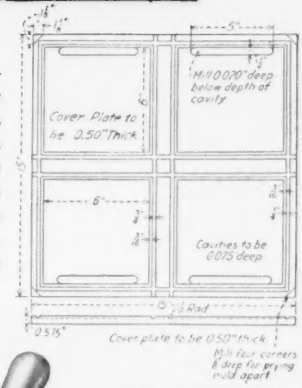
Single and 4-cavity Molds for making test slabs in stock. Molds for Adhesion test pieces, Abrasion test, Compression samples and Flexing tests molds made to order.


Cover Plate to be 0.50" Thick
M-11 0.070" deep below depth of cavity
Cavities to be .0075 deep
Cover plate to be 0.50" thick
Mill four corners ⅛ deep for prying mold apart

Standard ASTM and Federal dies for cutting test tensile and tear strength samples and dies for Slab curing carried in stock. Write for complete catalog.

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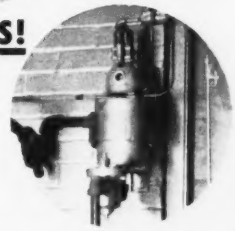
THIS MIGHT HAVE BEEN *prevented* by... THIS!



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Armstrong Air Controlled Steam Humidifiers remove this hazard. These units are simple, wholly dependable mechanisms which automatically maintain the required relative humidity by adding steam to the air. Thoroughly tested and proven in rubber plant applications. GUARANTEED TO SATISFY or your money back.

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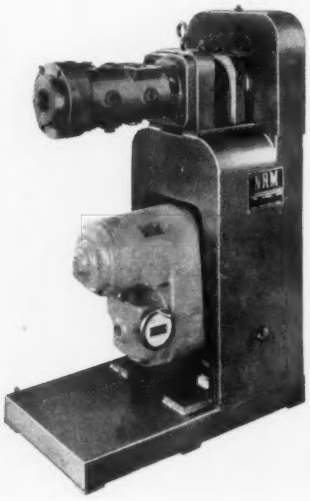
New Low-Cost NRM Rubber Extruder

A new low-cost 1½-inch rubber extruder has been added to the line of extruders manufactured by the National Rubber Machinery Co., Akron 8, Ohio. Designated as the NRM 1½-Inch Standard Model, it is designed for flexibility of use in both experimental work



and for continuous small cross-section production extrusions. It is compact in design and has all of the major features of larger NRM rubber extruders, including a standard 1½-inch diameter, alloy steel, heat-treated screw with hardened flight surfaces. The cylinder has a replaceable liner lined with Xaloy and with proven type circulating jackets. The feed box is designed for hand feeding with a standard undercut which can be varied to satisfy extremes in stock conditions.

Merry Christmas!

SEE PAGE 282

TIRE MOLDS

SPECIAL MACHINERY

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fair prices
reliable delivery
good workmanship

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Why, sure!

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Slash total tape expense
Get up to 60 curings from Martin longer-lasting All-Nylon Tape. Get 7 to 10 times more service than from cotton tape.

Produce a better finish
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Thermoid Company, Trenton, New Jersey, depends on Martin All-Nylon Cure Wrapping Tape

Check these superiorities:
Looped edge • Natural color • Standard widths in stock (1¾", 2", 2¼", 2½", 2¾", 3⅜", 3½") • Special widths on request • Put-up, 72 yard rolls, or to order

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Send for sample yardage today

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high styrene rubber resins,
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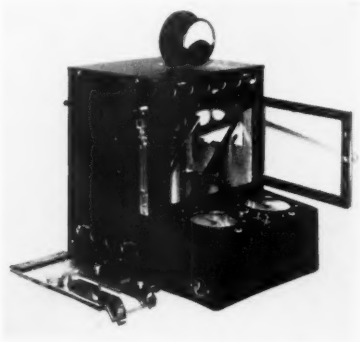
ORGANIC CHEMICALS DIVISION

SPI Flammability Tester

The SPI Flammability Tester developed by the Society of the Plastics Industry is now available from Custom Scientific Instruments, Inc., Arlington, N. J. The unit is capable of measuring the relative flammability hazard of various sheet materials from 0.001 to 0.250 inches thick, or more, including plastics, rubber, textile fabrics, paper, etc., varying from very flammable



to extremely flame-resistant. In use, the sample is easily mounted by laying it in a specimen holder outside the cabinet and snapping the spring tension jaw shut. Combustible samples are tested by sliding the specimen holder with sample into the cabinet. When the flame reaches test position, it contacts an igniting flame and simultaneously starts a timing clock. With the first burst of flame from a small vertical segment of the sample, a cotton thread is burned, stopping the ignition clock. Simultaneously, a second clock starts and continues to run until the traveling flame burns another thread, thus measuring ignition and burning rates automatically. Greater degrees of severity can be applied to flame-resistant materials. Highly flame-retarded samples, which will not continue to support combustion by themselves, are tested in vertical position by operating the clocks manually.

Type E-304 Robotron Controller

The newest automatic cycle controller in the Robotron line offered by Emmett Machine & Manufacturing, Inc., 2249 14th St., Akron 14, Ohio, is the Type E-304 Controller. This unit is said to be particularly suited to applications in the rubber and plastics industries where press "bumping" or "breathing" is essential. Capable of accurate timing and close control of press opening distance, the Robotron E-304 features push-button keyboards to set up cycles in a few seconds. A complete package unit, it includes operating push-buttons facing the press operator, lockable keyboard cover at the side, solenoid valve and internal pressure switch. Rugged electrical control elements, without electronic tubes, contribute to low maintenance and high dependability.

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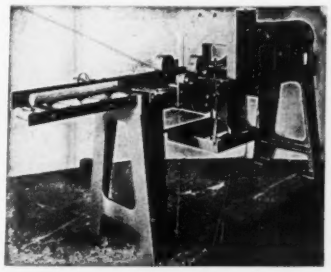

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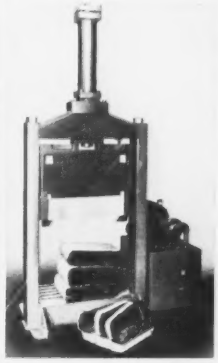

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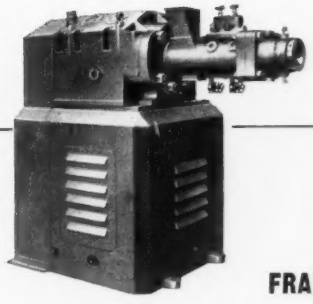

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REVIEWS

BOOKS

Vibration and Shock Isolation. By Charles E. Crede. Published by John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 328 pp. $6.50.

Resilient mountings are often designated as "shock mounts." As the author points out in his preface to this book, the term is a misnomer in many instances and a much more descriptive term is "isolators." Further, the term "isolators" may be considered as a generic designation which can be prefixed by vibration, shock, or sound, where necessary, to define characteristics that are associated with particular applications of isolators. This book is concerned with the basic mechanics of isolation and includes practical discussions on the design and application of isolators.

Written for the practicing engineer, the book, the first large study of the subject, analyzes the causes of vibration and shock and evaluates the use of natural and synthetic rubbers, metal springs, felt and cork for designing isolators. Sections of the volume are devoted to the special applications of isolators to such forms of machinery as punch presses, looms and electric motors, train and road-vehicle installations, and military equipment. There are 6 chapters in all and a subject index. Bibliographies are appended to each chapter.

Mr. Crede, the author, is well qualified to cover the subject. He worked for the Bureau of Ships of the Navy Department during the early part of World War II on problems of protecting equipment from severe shock, later organizing the Shock and Vibration Division of the Naval Research Laboratory. Since 1945, Mr. Crede has been vice-president and chief engineer of the Barry Corp., Watertown, Mass. His book is a definite contribution to the technical literature.

•

Physico-Chimie du Latex. (Physical Chemistry of Latex). By W. Kopaczewski. Published by Dunod, 92, Rue Bonaparte, Paris 6e, France. 6½ x 10 in. 168 pp. Paper Cover. Price: 1,200 francs.

As indicated by its title, this book is devoted to a discussion of the theoretical and industrial aspects of the physico-chemical characteristics of latex. The author has investigated such characteristics over a period of years, particularly with respect to the equilibrium of numerous latices. The results obtained are compared with previously published data. Much of the author's data is published for the first time in the book which also attempts to establish a uniform terminology covering all colloidal phenomena. Throughout the book the author stresses the importance of understanding the physico-chemical characteristics of latex to the proper solution of practical problems in manufacturing processes. The book is divided into three parts with a total of 7 chapters. Some 700 references appear in the bibliography.

•

Ten Thousand Commandments. By Harold Fleming. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. 5½ x 8 in. 206 pp. Paper Cover, $2.25; Hard Cover, $3.00.

This is a comprehensive, yet readable, history of the changes in the interpretation of the nation's anti-trust laws, occasioned by decisions handed down in recent years by the U. S. Supreme Court. In a fast but fully documented vernacular, it tells the story of the attacks made by government lawyers on various business practices, including the offering of quantity discounts, the quoting of delivered prices, the cutting of prices to get more volume, and the "excluding" of competitors by "building better mousetraps." According to the author, the Federal Trade Commission and the Department of Justice, with the help of the Supreme Court, have framed "ten thousand confusing commandments for American business" and have begun to balk competition in the name of protecting it. Although written about lawyers, the book was written for the public.

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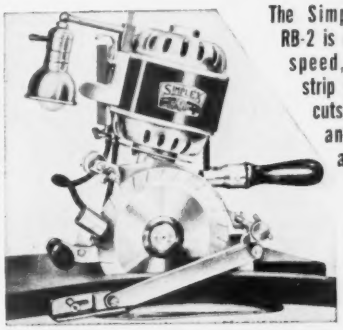

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REVIEWS (CONT'D)

Annual Report on the Progress of Rubber Technology: 1950. (Vol. XIV). Edited by T. J. Drakeley. Published by the Institution of the Rubber Industry, 12, Whitehall, London, S.W. 1, England. 7¼ x 9¾ in. 114 pp. Price: £1, 1s, od. (approximately $3.00).

The latest edition of this excellent annual report on the progress of rubber technology is marked by the adoption, for the first time, of a rigid cover. Since these reports are constantly handled by frequent use the adoption of a rigid cover is a welcome improvement. Once again the report covers eleven specific branches of the rubber manufacturing field plus special general reports on such subjects as the planting and production of raw rubber, properties and use of latex, physics and chemistry of raw rubber and rubber derivatives, synthetic rubber, testing equipment, fibers and fabrics, physical and chemical properties of vulcanized rubber, works processes and materials, and machinery and appliances. As usual, each chapter is contributed by leading authorities in the field. Author and subject indexes are included.

•

Patents for Technical Personnel. By Dr. Worth Wade. Chemonomics, Inc., 400 Madison Avenue, New York 17, N. Y. 6 x 9 in. 44 pp. $3.00.

Without footnotes, case histories, and legal terminology, this book simply and accurately discusses what a patent is, lists the steps which must be taken to protect an invention, discusses interference and prosecution of patents, describes a typical patent department of a company and discusses its relation to the inventor-employee, etc. A most important, and so far neglected subject, is found in the last chapter: How to read a patent. Not only does this section clearly analyze the contents of a patent, but it presents a systematic method for analyzing and checking claims. A four-page pictorial section follows an invention from idea to patent. This handbook has been written for the inventor and employee of a chemical process plant. Its language is for laymen, not the patent attorney. In all, this book presents a complete, unobstructed picture of patents, their use and functions.

•

Automobile Facts and Figures. (31st Edition). Automobile Manufacturers Association, New Center Bldg., Detroit 2, Mich. 6 x 8¾ in. 80 pp.

First published in 1919, this yearbook has statistically chronicled the spectacular growth of U. S. highway transport over the past 32 years. This latest edition, the 31st, offers detailed data on a number of surveys covering such subjects as motor vehicle registration, production, sales, exports, roads, taxes, and all other information having to do with motor transportation.

Merry Christmas!

SEE PAGE 282

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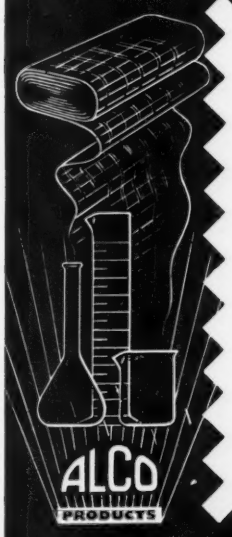

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BOOKLETS, CATALOGS, etc.

Characteristics of the Brown Electronik Continuous Balance System. (Bulletin No. B15-12). Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Wayne and Windram Aves., Philadelphia 44, Penna. 8¾ x 11¼ in. 24 pp.

This bulletin offers a description of the Brown Electronik continuous balance system including a discussion of the circuit and component characteristics of the amplifier and motor combination. General characteristics of balancing motors are described while performance charts outline their capabilities. Such matters as adaptability considerations are also discussed as to amplifier impedance, burnout, desensitizing, and A-C operation. A section of the bulletin is devoted to applications. Charts, graphs and diagrams illustrate the bulletin.

•

New Developments in Factory Sprinkler Protection. Engineering Division, Associated Factory Mutual Fire Insurance Companies, 184 High Street, Boston 10, Mass. 8½ x 11 in. 8 pp.

Important new facts on automatic sprinkler protection, especially as applied to the storage of rubber tires and other high-piled combustible storage, are covered in this booklet. In order to cover the problem fully, the Factory Mutual Laboratories instituted Research Project No. 11528 to find a practical fire protection method for storage of rubber tires. The conclusions of this research project are outlined in this booklet which is illustrated with photographs and charts.

•

pH and Conductivity Recorders and Controllers. (Catalog No. 15-16). Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Wayne and Windram Aves., Philadelphia 44, Penna. 8½ x 11 in. 40 pp.

This new catalog covering hydrogen ion concentration, oxidation-reduction potential, and electrolytic conductivity contains up-to-date information on equipment for these vital process variables. The catalog is an extensive revision of a previous catalog and includes new information on latest designs of pH electrodes and conductivity cells. Included are fundamental operating principles, descriptions of measuring systems, and details of components, as well as numerous typical applications.

•

Brown Thermocouple Wells. (Catalog No. 200-1). Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Wayne and Windram Aves., Philadelphia 44, Penna. 8½ x 11 in. 28 pp.

Much technical information concerning the selection of the proper well for any given application is provided in this catalog. Curves are provided to show the method of selecting the proper well shape and thickness. Information is also presented on the proper selection of proper well material. Photographs and dimensional drawings of all standard Brown wells together with basic prices are shown in the catalog.

•

Milo Electronic Tubes for all Industrial Applications. Milo Radio and Electronic Corp., 200 Greenwich St., New York 7, N. Y. 8½ x 11 in. 28 pp.

Designed for industrial use, this booklet furnishes complete technical specifications and information on hundreds of special purpose electronic tubes used in various industrial applications, i.e., control, processing production, research, testing, counting, sorting, weighing, measuring, detecting, broadcast and microwave communications, avionics, radar, etc. Featured are standard, nationally known brands.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, DEC. 6, 1951

Natural Rubber

Any number of foreign rubber consumers are refraining from making new commitments in natural rubber pending more definite word on the United States synthetic rubber export program. It is still too early to accurately judge Far Eastern reaction to the U. S. government announcement that restrictions on consumption of new rubber will be largely eliminated after January 1, 1952.

Malayan planters have reported that they have lost 20% of their rubber to Communists and other marauders. A spokesman for the Rubber Producers' Council gave the figures to the British Colonial Secretary at Kuala Lumpur, where he is studying the war against the Communists. A spokesman said the thefts cost the industry about $70,000,000 a year.

Early this year a Rubber Packing and Shipping Ordinance was passed by the Singapore and Federal Legislative Councils which made it necessary for every packer and shipper of rubber to be licensed. The law was designed to insure that all rubber shipped overseas conforms to certain specified standards. It was, however, considered necessary for some grading scheme to be introduced to protect Malayan producers and packers from large claims for default in quality of rubber shipped.

When the ordinance was put into effect on November 1, a Malayan Rubber Export Registration Board was set up to supervise the operation of the law and issue licenses. Wide powers are conferred on the board and its officers to search offices and records of shipment.

Quotations for the markets in London and Singapore, follow:

London Market

(Standard Smoked Sheets)

January	47.25 - 47.34
January-March	46.67 - 46.96

Singapore Market

(Standard Smoked Sheets)

January	45.03 - 45.10

Domestic Natural Rubber Prices

Grade	Price (per lb.)
Ribbed Smoked Sheets—No. 1	52c
No. 2	51¼
No. 3	50½
No. 4	48½
No. 5	44
Thin Latex—No. IX	60
No. 1	59
No. 2	56
No. 3	53
Thick Latex—No. IX	60
No. 1	59
No. 2	56
No. 3	53
Thin Brown—No. IX	47
No. 2X	44½
No. 3X	40
No. 1	42
No. 2	41
No. 3	40
No. 4	38
Blanket (Amber)—No. 2	42
No. 3	41
No. 4	40
Smoked Blanket—No. 1	42
No. 2	40
Flat Bark	34
Beni Bolivian Para	45
Upriver Fine Para	43
Liquid Latex	64

Note: These are General Services Administration Prices (plus service charges) for delivery ex G.S.A. shipping points.

Scrap Rubber

According to Amendment 2 to CPR 50, dated November 21, 1951, the ceiling on GR-S tube scrap in the Los Angeles area will be no less than ½c per pound irrespective of the number of specified deductions which may apply to a sale. Of course, the commodity may be bought and sold for less than the ceiling price. There has been only limited activity in the market during the past period although industry leaders have urged a greater flow of scrap from military installations. OPS prices for scrap rubber follow:

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	.02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

Industry sources advise that there has been a moderate quickening of activity in the reclaimed rubber market. The recent government announcement to eliminate curbs on rubber consumption is not expected to have too great an effect upon reclaimed rubber due to large price differentials which presently exist. OPS-established prices for reclaimed rubber follow:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

The upturn of activities in the cotton tire fabric market evident during the past few months has been sustained during the past period. Prices have been adjusted upward to more accurately reflect current conditions. Current prices follow:

Standard, Peeler, 12/4 2	lb.	.99
Extra Staple, Peeler, 12/4 2	lb.	.96

Chafers

14.4 oz. (per square yard)	lb.	.86
9.25 oz. (per sq. yard)	lb.	.81
11.65 oz. (per sq. yard)	lb.	.79
8.9 oz. (per sq. yard)	lb.	.84

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 2.35c since our last report (November 7), high for the period being 44.65c reached on November 9 and 10, and low being 42.30c reached on November 17. The average price of middling uplands for the month of November was 42.70c based on 23 trading days. This compares with an average of 38.13c in October.

Raw cotton industry representatives have split on proposed changes in OPS spot and futures regulations. Producers, merchants and exporters want the differentiation between mixed and even running lots in the present spot order eliminated with futures ceilings changed to reflect the single price. Mills, on the other hand, want the order left alone.

Cotton producers can meet the Agriculture Department's 1952 goal of 16,000,000 bales only if they get the necessary government help, the National Cotton Council said recently. An agreement to enable farmers to get Mexican laborers is needed to insure the expected output on 28,000,000 acres, NCC added. Shortages of labor-saving machinery, pesticides and fertilizer may also reduce the output unless some action is taken, NCC officials declared.

The International Cotton Advisory Committee has estimated that world production of cotton in the 1951-52 season would be 33,300,000 bales, an increase of 5,700,000 over last season's low crop of 27,600,000 bales, largely because of increased production in the United States during the period.

Quotations for middling uplands on the Exchange follow:

	Nov. 7	December 7		
	Close	High	Low	Close
Dec.	39.90	43.70	43.54	43.67
Mar.	39.72	43.35	43.14	43.30
May	39.50	43.15	42.96	43.10

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.465 - .475
Butaprene NL	.475 - .485
Butaprene NAA	.515 - .525
Butaprene NXM	.550 - .560
Chemigum 30N4NS	.400 - .470
Chemigum 50N4NS	.400 - .470
Chemigum N3	.450 - .520
G-E Silicone Rubber (compounded)	3.20 - 4.40
G-E Silicone Gum (not compounded)	—— - 5.00
GR-I	—— - .207½
GR-S	—— - .260
Hycar OR-25	.450 - .460
Hycar OR-15	.520 - .530
Hycar OS-10	.500 - .510
Neoprene Types CG and AC	—— - .500
Neoprene Type E	—— - .650
Neoprene Types FR and KNR	—— - .800
Neoprene Type GN	—— - .380
Neoprene Type GN-A	—— - .380
Neoprene Type RT	—— - .400
Neoprene Type S	—— - .380
Neoprene Type W	—— - .400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 - 4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— - 1.000

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868 E. Tallmadge Ave.
Blackstone 4148

In Los Angeles:
Merit Western Co.
George Stoubner
1248 Whitesaw St.
Tucker 8851

CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

DECEMBER 7, 1951

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

[a] East of Mississippi.

*For Export Only

—The arrangement of this section follows closely the Chemical Section of the 1951-52 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name.

—Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry.

ACCELERATORS

A-1 (Thiocarbamlide)	lb.	.48	-	.55
A-32	**lb.**	**.59**	**-**	**.69**
A-77	lb.	.47	-	.60
A-100	lb.	.47	-	.60
Accelerator No. 8	lb.	—	-	.98
Accelerator—49	lb.	.48	-	.49
Accelerator—89	**lb.**	**—**	**-**	**1.20**
Accelerator—122	**lb.**	**—**	**-**	**1.30**
Accelerator—552	lb.	—	-	2.00
Accelerator—808	**lb.**	**.59**	**-**	**.61**
Accelerator—833	**lb.**	**1.13**	**-**	**1.15**
Altax	lb.	.42	-	.44
Ancap*	lb.	.27	-	.29
Ancatax*	**lb.**	**.35**	**-**	**.37**
Ancazide* ET	**lb.**	**—**	**-**	**1.00**
ME	**lb.**	**—**	**-**	**1.10**
Ancazate* BU (ET & ME)	lb.	—	-	1.00
Arazate	**lb.**	**—**	**-**	**2.16**
Beutene	**lb.**	**.59**	**-**	**.61**
Bismate, Rodform	lb.	—	-	3.00
Butasan	**lb.**	**—**	**-**	**1.00**
Butazate	**lb.**	**—**	**-**	**1.00**
Butyl Eight	lb.	1.00	-	1.35
Captax	lb.	.34	-	.36
C-P-B	lb.	—	-	1.95
Cumate, Rodform	**lb.**	**—**	**-**	**1.45**
Dibenzo G-M-F	lb.	—	-	2.50
Diorthotolylguanidine	lb.	.52	-	.53
Diphenylguanidine	lb.	.43	-	.44
El-Sixty	lb.	.45	-	.52
Ethasan	**lb.**	**—**	**-**	**1.00**
Ethazate	**lb.**	**—**	**-**	**1.00**
Ethex	**lb.**	**—**	**-**	**1.00**
Ethyl Thiurad	**lb.**	**—**	**-**	**1.00**
Ethyl Tuex	**lb.**	**—**	**-**	**1.00**
Ethylac	lb.	.88	-	.90
G-M-F	lb.	—	-	2.50
Good-rite Erie	lb.	.35	-	.37
Guantal	lb.	.55	-	.62
Harvex	lb.	.52	-	.57
Hepteen	**lb.**	**.42**	**-**	**.44**
Base	**lb.**	**1.80**	**-**	**1.85**
Ledate, Rodform	lb.	—	-	1.00
Mercaptobenzothiazole	lb.	.34	-	.36
Mercaptobenzothiazyl Disulfide	lb.	.42	-	.44
Mertax	lb.	.50	-	.57
Methasan	**lb.**	**—**	**-**	**1.00**
Methazate	**lb.**	**—**	**-**	**1.00**
Monex	**lb.**	**—**	**-**	**1.10**
Mono Thiurad	**lb.**	**—**	**-**	**1.10**
Morfex	lb.	.59	-	.61
Z-MT	lb.	—	-	.75
NA-22 (for neoprene)	lb.	—	-	1.50
O-X-A-F	lb.	.43	-	.45
Pentex	lb.	—	-	1.00
Flour	lb.	—	-	.20
Permalux (for neoprene)	lb.	—	-	1.85
Phenex	lb.	.40	-	.45
Pipazate	**lb.**	**—**	**-**	**1.53**
Pip-Pip	lb.	—	-	2.35
R-2 Crystals	lb.	—	-	2.20
Rotax	lb.	.44	-	.46
RZ-50	lb.	—	-	1.00
SA 52	lb.	—	-	1.10
SA 57	lb.	—	-	1.00
SA 62	lb.	—	-	1.00
SA 66	lb.	—	-	1.45
SA 67	lb.	—	-	1.00
SA 77	lb.	—	-	1.00
Safex	lb.	—	-	1.15
Santocure	lb.	.68	-	.75
Selazate	**lb.**	**—**	**-**	**1.45**
Selenac (Ethyl, Methyl)	lb.	—	-	1.45
Setsit-5	lb.	.75	-	1.05
SPDX-GH (toms)	**lb.**	**.64**	**-**	**.69**
GL	lb.	—	-	.95
Tellurac	**lb.**	**—**	**-**	**1.45**
Tepidone	**lb.**	**—**	**-**	**.55**
Tetrone	**lb.**	**—**	**-**	**1.25**
A	**lb.**	**—**	**-**	**1.85**
Thiofide	lb.	.42	-	.49
Thionex	**lb.**	**—**	**-**	**1.10**
Thiotax	lb.	.34	-	.41
Thiurad	**lb.**	**—**	**-**	**1.10**
Thiuram E	**lb.**	**—**	**-**	**1.00**
M	**lb.**	**—**	**-**	**1.10**
Trimene	**lb.**	**.54**	**-**	**.56**
Base	**lb.**	**1.03**	**-**	**1.06**
Tuads, Ethyl	**lb.**	**—**	**-**	**1.00**
Tuads, Methyl	**lb.**	**—**	**-**	**1.10**
Tuex	lb.	—	-	1.10
Ultex	lb.	1.00	-	1.05
Unads	**lb.**	**—**	**-**	**1.10**
Ureka Base	lb.	.66	-	.73
Ureka C	**lb.**	**.68**	**-**	**.75**
Vitasan Crystals	**lb.**	**.48**	**-**	**.53**
Vulcanex	lb.	—	-	.53
Z-B-X	**lb.**	**—**	**-**	**2.45**
Zenite	lb.	.42	-	.44
A	lb.	.50	-	.52
B	lb.	.50	-	.52
Zenite Special	lb.	.43	-	.45
Zetax (uncoated)	lb.	.43	-	.45
Zimate, Butyl	**lb.**	**—**	**-**	**1.00**
Zimate, Ethyl	**lb.**	**—**	**-**	**1.00**
Zimate, Methyl	lb.	—	-	1.00

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.13¼	-	.14¼
Fish Oil, Hydrogenated, Fatty Acid				
Hydrofol Acid (dlvd.)	lb.	.11½	-	.15¼
Hyfac 430 (dlvd.)	lb.	.17¾	-	.19
Neo-Fat H.F.O. (dlvd.)	lb.	.14½	-	.15¾
Stearex Beads (dlvd.)	lb.	.12	-	.13¼
Lime, Hydrated				
Arrowhead	ton	—	-	20.65
Marblehead	ton	—	-	14.30
Sierra	ton	—	-	19.50
Litharge				
Eagle (dlvd.)	lb.	—	-	.2190
FSB (dlvd.)	lb.	—	-	.2255
Magnesium Oxide, Heavy				
General Magnesite 500	lb.	.05	-	.06½
600	lb.	.06	-	.08
Michigan No. 15	lb.	.0550	-	.0600
Permanente	lb.	.05	-	.06½
Magnesium Oxide, Light				
Baker's (Neoprene Grade)	lb.	—	-	.31
General Magnesite (Neoprene Grade)	lb.	—	-	.30
General Magnesite No. 101	lb.	—	-	.19
General Magnesite Standard	lb.	—	-	.22
K & M (Neoprene Grade)	lb.	—	-	.31
Maglite D	lb.	—	-	.25
M	lb.	—	-	.31
Marine's (Neoprene Grade (l.c.l.)	lb.	—	-	.31
Michigan No. 30	**lb.**	**—**	**-**	**.24**
No. 40 Extra Light	**lb.**	**—**	**-**	**.31**
Witco Extra Light	lb.	.32	-	.35

ACTIVATORS (Cont'd)

Oleic Acid				
Emersol 210 (dlvd.)	lb.	.12½	-	.14¼
L.C.P. Red Oil	lb.	.12½	-	.14¼
Palm Oil Fatty Acid (c.l.)	lb.	.11½	-	.14½
Potassium Oleate (drums)	lb.	.45	-	.55
Red Lead				
Eagle	lb.	—	-	.2282
No. 2 RM (dlvd.)	lb.	—	-	.2282
Sodium Laurate, 75%	lb.	.64	-	.74
Sodium Oleate, 75%	lb.	.45	-	.55
Paste (drums)	lb.	—	-	.20
Sodium Stearate, 75%	lb.	.45	-	.55
USP Grade (drums)	lb.	—	-	.37
Stearic Acid, Single Pressed				
Emersol 110 (dlvd.)	lb.	.12	-	.12¼
Groco 53	lb.	.12	-	.12¼
Stearex B (dlvd.)	**lb.**	**.15¼**	**-**	**.16¾**
Stearic Acid, Double Pressed				
Groco 54	lb.	.12½	-	.13¼
Stearic Acid, Other				
Neo-Fat 1-58	lb.	.1190	-	.1315
1-60	lb.	.1400	-	.1525
1-65	lb.	.1450	-	.1575
White Lead Basic Carbonate	lb.	—	-	.2110
White Lead Basic Sulfate	lb.	.13¼	-	.14¼
Zinc Laurate				
Laurex	lb.	.29	-	.30
Zinc Stearate	lb.	.41	-	.43
Aquazinc	lb.	.20	-	.35

Unclassified Activators

Actifat (dms.)	lb.	—	-	.18
Aktone	lb.	.22	-	.23
Barak	lb.	—	-	.60
Curade	lb.	.57	-	.59
D-B-A	lb.	—	-	1.95
Delac J	**lb.**	**.55**	**-**	**.57**
Dibutylamine (dlvd.)	lb.	.54¾	-	.55¾
MODX-B	lb.	.20	-	.25
NA-11	**lb.**	**—**	**-**	**.65**
Polyac	lb.	—	-	1.60
Ridacto (drums)	lb.	.25	-	.26
Snodotte (dlvd.)	lb.	.16	-	.17¼
SOAC (min. 10 dms.)	cwt.	—	-	8.00
SOAC-KL (min. 10 dms.)	cwt.	—	-	8.00
Vulklor	lb.	.75	-	.85

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	**lb.**	**.17**	**-**	**.21**
Aqua Ammonia (dms.)	lb.	.031	-	.035
M.B.M. (l.c.l.)	lb.	—	-	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	-	.12½
Regular	lb.	—	-	.08½
D.C. Antifoam A	lb.	5.65	-	6.65
Defoamer 630	**lb.**	**—**	**-**	**.12½**
Modicol A	lb.	.12	-	.15
B	lb.	.35	-	.40

ANTI-OXIDANTS

Agerite Alba	lb.	2.20	-	2.30
Gel	lb.	.60	-	.62
Hipar	lb.	.91	-	.93
H. P.	lb.	.67	-	.69
Powder	lb.	.49	-	.51
Resin	lb.	.65	-	.67
Resin D	lb.	.49	-	.51
Stalite	lb.	.49	-	.51
White	lb.	1.40	-	1.50
Akroflex C	lb.	.67	-	.69
F	lb.	.67	-	.69
Aminox	lb.	.49	-	.51
Antioxidant 2246	lb.	1.60	-	1.63
Antox	lb.	.49	-	.51
Aranox	lb.	—	-	3.25
Benzoquinone	lb.	1.50	-	1.75
Betanox Special	lb.	.70	-	.72
B-L-E	lb.	.49	-	.51
Carvacrol	lb.	—	-	.78
Deenax	lb.	.95	-	1.05
Eugenol C-95%	lb.	—	-	1.65
Flectol H	lb.	.49	-	.56
Flexamine	lb.	.67	-	.69
Neozone Standard	lb.	—	-	.82
A	lb.	.51	-	.53
C	lb.	—	-	.67
D	lb.	.49	-	.51

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ANTI-OXIDANTS (Cont'd)

Oxidex	lb.	——	**3.00**
Parazone	lb.	——	.75
PDA-10 and 20	lb.	.36	.38
Permalux	lb.	——	1.85
Resorcin, Tech. (dlvd.)	lb.	——	**.64**
Santoflex AW	lb.	.75	.82
B	lb.	.49	.56
BX	lb.	.60	.67
35	lb.	.67	.74
Santovar-A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.55	1.62
Santowhite L	lb.	.49	.56
MK	lb.	1.25	1.32
S.C.R. (tons)	lb.	**.32**	**.34**
Sequestrene AA	lb.	——	1.00
NA2	lb.	——	.82
NA3	lb.	——	.80
Stabilite	lb.	.49	.51
Alba	lb.	.69	.74
L	lb.	.60	.62
White	lb.	.49	.51
Stabilizer No. 1	lb.	——	1.55
Stabilizer No. 320	lb.	——	.75
Sunolite	lb.	.20	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex	lb.	1.61	1.63
A	lb.	.98	1.00
V-G-B	lb.	.65	.67
Wing-Stay S	lb.	.48	.49

ANTI-SCORCHING AGENTS

Armeen HT	lb.	.34	.42
Benzoic Acid, Tech.	lb.	——	.43
Good-rite Vultrol	lb.	.58	.60
Sodium Acetate 60-62% Crystals	lb.	——	**.06**

ANTISEPTICS AND GERMICIDES

Arquad S	lb.	.22	.25
Formaldehyde (dms.)	lb.	——	.062
G-4 (bbls.)	lb.	.95	2.95
G-11	lb.	——	3.45
Nuodex 100 S.S. (dlvd.)	lb.	——	1.10
Nuodex 100 W.D. (dlvd.)	lb.	——	1.25
Nuodex Zinc 8% (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°-27°)	lb.	——	.201
Retarder D	lb.	.42	.50
Soligen Drier—Copper 8% (drums)	lb.	——	.22¾
Zinc 8% (dms.)	lb.	——	.21¼
Vancide	lb.	——	.80

ANTI-WEBBING AGENTS (for Latex)

Webnix 33	lb.	1.50	2.25
34	lb.	1.75	2.25

AROMATICS (DEODORANTS)

Bouquet 149	lb.	——	**3.00**
Coumarin	lb.	——	**2.75**
Curodex 19	lb.	——	**4.75**
188	lb.	——	**5.75**
198	lb.	——	**6.75**
Deodorant 65	lb.	——	**1.00**
Deodorant L-37	lb.	2.00	**2.40**
L-44	lb.	2.50	**2.90**
N.L.T.X	lb.	1.85	**2.15**
Deodorant Oil GD 3427	lb.	1.70	2.00
4440	lb.	3.00	3.50
5296	lb.	1.30	1.60
General Deodorant 18301	lb.	——	2.40
Latex Perfume 5	lb.	——	**3.25**
6	lb.	——	**7.50**
9	lb.	——	**.65**
Naugaromes (dms.)	lb.	**1.50**	**3.00**
Neutrodor 31	lb.	2.00	2.50
Neutroleum Delta	lb.	——	2.60
Gamma	lb.	——	2.60
Parador A	lb.	1.75	2.25
B	lb.	.70	1.00
C	lb.	2.75	3.25
D	lb.	1.50	2.00
E	lb.	.25	.55
F	lb.	.32	.47
GD 5280	lb.	2.00	2.50
GD 5348	lb.	1.90	**3.25**
I	lb.	1.95	2.25
K	lb.	.45	.60
Perfume Oil Bouquet Vanilla M	lb.	**2.40**	**2.75**
Resodor 11	lb.	2.00	2.50
12	lb.	1.45	1.75
Rodo No 0	lb.	4.00	**4.50**
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	1.00	3.80
Rubber Perfume 12	lb.	——	2.85
Russian Leather 7	lb.	——	**4.10**
Vanillin	lb.	3.00	4.05

BLOWING AGENTS

Ammonium Bicarbonate (dlvd.)	lb.	.0625	.1075
Blowing Agent CP-675	lb.	——	.35
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	**1.95**
Sponge Paste	lb.	——	**.20**
Unicel	lb.	——	**.82**
ND	lb.	——	**1.40**
S	lb.	——	**.20**
Urea	lb.	.0425	**.0475**

BONDING AGENTS

Durez 12987	lb.	**.48**	**.53**
MDI	lb.	**7.00**	**7.75**
50	lb.	2.75	3.25
Pliobond 20	gal.	**2.75**	**4.00**
30	gal.	**3.45**	**4.70**
Reanite	gal.	6.75	7.25
Rex Compounds	gal.	**1.30**	**2.85**
Ty-Ply Q (BN & S)	gal.	6.75	8.00

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	8.11	8.61
Glacial—99½% (bbls.)	cwt.	14.05	14.55
Calcium Nitrate, Tech., Crystals	lb.	.07	.17
Hydroxyacetic Acid—70% (dms.)	lb.	——	.084
Zinc Nitrate, Tech.	lb.	——	.22½

COLORING AGENTS

Black

Aquablak B (also M, R)	lb.	.07¼	.11¾
Aquablak S	lb.	.11¼	.12
Black Shield 4-35 (dms.)	lb.	——	.0825
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)	lb.	.11¼	.12
Raven Black Pure Iron Oxide	cwt.	11.00	11.25

Blue

Blue GD, Dispersed	lb.	——	4.55
Blue GD Paste	lb.	——	1.80
Blue YD, Dispersed	lb.	——	2.75
Milori Blue 11840 (dlvd.)	lb.	——	.37
Monastral Fast Blue CPL	lb.	——	1.77
PCD, Dispersed	lb.	——	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	——	1.15
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	.90	2.40
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	.12	.1225
Mapico Brown (50 lb. bags)	lb.	.12¼	.13

Green

Filo Green D-700 (and D-705)	lb.	——	.30
Green Chromium Oxide, Pure	cwt.	34.50	40.50
Green Chromium Oxide, Pure, Hydrated	cwt.	85.00	100.00
Green FD, Dispersed	lb.	——	1.85
Monastral Fast Green GSD, Dispersed	lb.	——	3.20
GSL	lb.	——	1.97
Permansa Green CP-594	lb.	——	1.35
Pigment Green B	lb.	——	1.35
GL-652D	lb.	.88	.93
Ramapo Green	lb.	——	4.00
Rubber Green X-1292	lb.	——	1.00
Stan-Tone Green	lb.	1.50	3.30
Vansul Green M.B.	lb.	1.05	2.45

Maroon

Stan-Tone Maroon	lb.	**3.00**	**3.05**
Vansul Maroon M.B.	lb.	1.05	2.80

Orange

Molybdate Orange	lb.	——	.45
Orange FD, Dispersed	lb.	——	**2.75**
Rubber Orange X-2065	lb.	——	2.60
Stan-Tone Orange	lb.	1.65	4.00
Vansul Orange M.B.	lb.	2.15	3.15

Red

Antimony Trisulfide	lb.	.72	.78
R. M. P. Sulfur Free	lb.	——	.78
R. M. P. No. 3	lb.	——	.72
Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.30	1.55
Graphic Red (dlvd.)	lb.	——	.80
Indian Red, American, Pure	cwt.	11.75	12.00
Doxco (English)	cwt.	11.50	11.75
Mapico Reds (50 lb. bags)	lb.	.1225	.1350
Oximony Iron Oxide	lb.	——	.09
Red Iron Oxide, Light	cwt.	11.75	12.00
Red PBD, Dispersed	lb.	——	1.75
2BD, Dispersed	lb.	——	1.80
2BL	lb.	——	1.32
PBL	lb.	——	1.65
Rubanox Red CP-762 (dlvd.)	lb.	——	**1.40**
Rubber Red CP-339 (dlvd.)	lb.	——	1.05
Rubber Red RT-364	lb.	——	.75
Rubber Red RT-425	lb.	——	.75
Rubber Red X-1148	lb.	——	**.80**
Rubbered	lb.	.1150	.1175
Solfast Red CP-663 (dlvd.)	lb.	——	1.80
CP-787 (dlvd.)	lb.	——	1.30
Stan-Tone Red	lb.	1.10	**3.05**
Sun Burnt Red	lb.	.1150	.1175
Vansul Red M.B.	lb.	.90	2.60
Watchung Red	lb.	——	1.95

White—Lithopone

Albalith	lb.	.0790	.0890
Astrolith	lb.	**.06¼**	**.07¼**
Cryptone BT	lb.	.10	.11
Eagle	lb.	**.06¼**	**.06½**
Permalith	lb.	**.06¼**	**.06¾**
Ponolith	lb.	.0750	.0865
Sunolith	lb.	.06½	.07¼

White—Titanium Pigments

Ti-Cal	lb.	.08	.08¾
Ti-Pure	lb.	.21	.24
Titanox A—all grades (dlvd.)	lb.	.19¼	.20½
RA (dlvd.)	lb.	.21¼	.22¾
RA-10 (dlvd.)	lb.	.21½	.22½
RA-NC (dlvd.)	lb.	.21½	.22½
RC (dlvd.)	lb.	.07¾	.08¼
RC-HT (dlvd.)	lb.	.07¾	.08
Unitane O-220	lb.	**.195**	**.205**
OR-250	lb.	**.215**	**.225**
Zopaque	lb.	**.19½**	**.20¼**

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55)	lb.	.1760	.1860
Eagle	lb.	.1760	.1860
Horse Head Special	lb.	.1760	.1860
XX Red	lb.	.1760	.1860
XX 505	lb.	.1910	.2010
Protox 166	lb.	.1760	.1860
167	lb.	.1760	.1860
St. Joe Black Label	lb.	.1760	.1860
Green Label	lb.	.1760	.1860
Red Label	lb.	.1760	.1860

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	**.13**

White—Zinc Oxide (French Process)

AZO ZZZ 66	lb.	.1985	.2085
Eagle Green Seal	lb.	.1935	.2035
Eagle Red Seal	lb.	.1885	.1985
Eagle White Seal	lb.	.1985	.2085
Florence Green Seal	lb.	.1935	.2035
Red Seal	lb.	.1885	.1985
White Seal	lb.	.1985	.2085
Kadox 25	lb.	.1985	.2085
Kadox 15, 17 and 72	lb.	.1760	.1860
U. S. P. 12	lb.	.2085	.2185

White—Zinc Sulfide

Cryptone ZS-800	lb.	.24	.25

Yellow

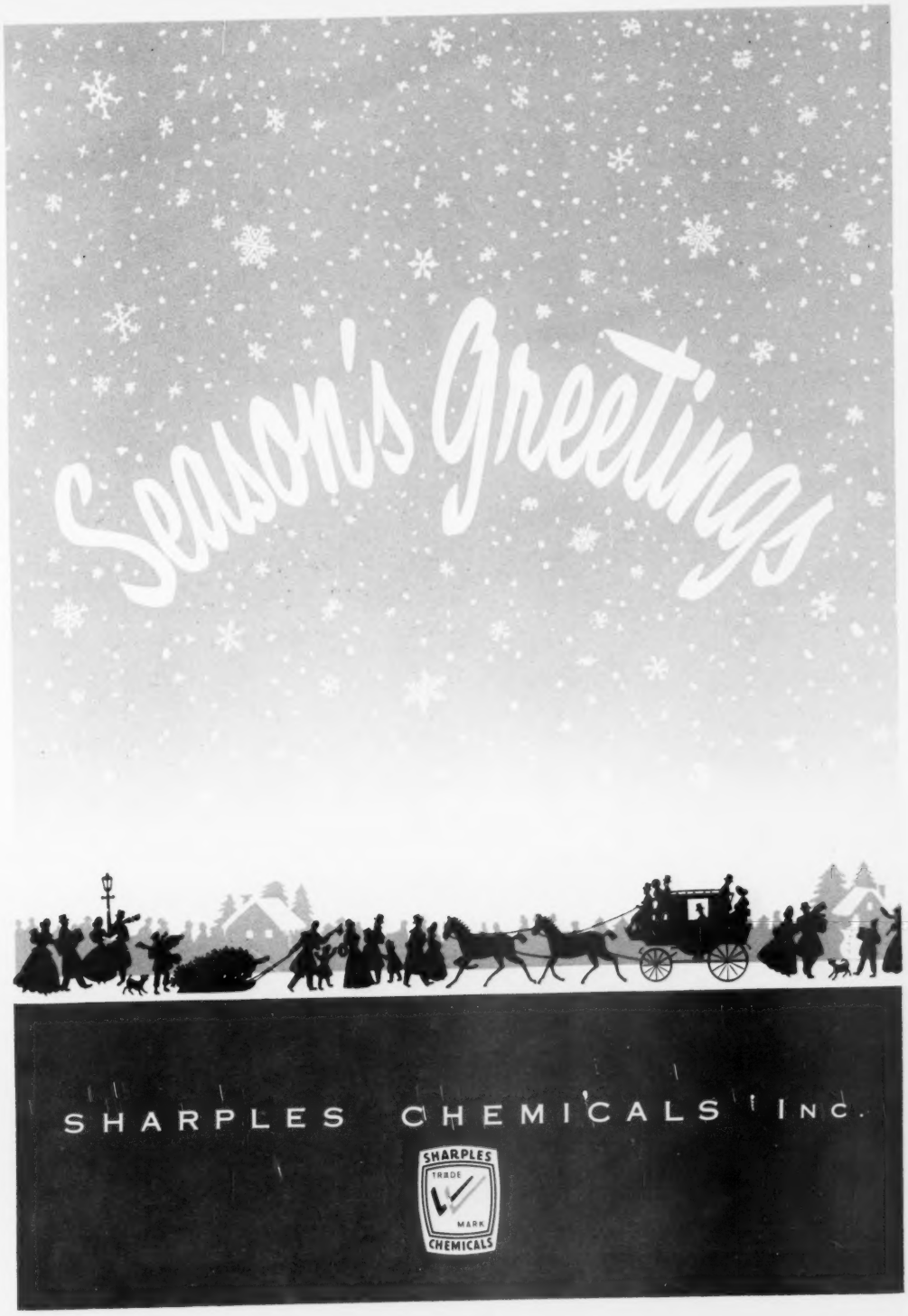
Anchor Brand Pure Iron Oxide	cwt.	9.00	9.25
Cadmolith Yellow (bbls.)	lb.	——	.95
Chrome Yellow	lb.	——	.32
Chrome Yellow 12310	lb.	——	.28
Ferrox	cwt.	7.50	**8.50**
Mapico Yellow (50 lb. bags)	lb.	.1000	.1025
Rubber Yellow X-1940	lb.	——	**1.60**
Stan-Tone Yellow	lb.	1.00	2.25
Toluidine Yellow	lb.	——	1.91
YL-556-D	lb.	——	**.82**
Oximony Iron Oxide	lb.	——	**.06¾**
Vansul Yellow M.B.	lb.	.95	1.55
Yellow GD, Dispersed	lb.	——	2.15
GL	lb.	——	1.62
Zinc Yellow	lb.	——	.27

DISPERSING AGENTS

Anchoid*	lb.	.24	.25
Armeen 18	lb.	.42	.50
Daryan No. 1 (and No. 2)	lb.	.27	.30
Daxad 11 (21, 23)	lb.	**.08**	**.35**
Dispersaid	lb.	1.25	1.35
Furala	lb.	.06½	.07½
Halloid	lb.	.04½	.05½
Marasperse C	lb.	.06	.06½
CB	lb.	.11½	.13½
N	lb.	.09	.10
Modicol C	lb.	.08	.12
Rubflex	lb.	.267	.285
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	——	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
Tetramine D-25	lb.	.32½	.36
Triethanolamine (drums) (dlvd.)	lb.	.21½	.22½
Yelkin TT	lb.	.14	.18
Zinsper	lb.	——	.15

EXTENDERS

Advagum 1098	lb.	——	.64
Bunaweld Polyrtaer No. 780	lb.	——	**.22**
No. 5514	lb.	——	.35
D-92 (and D-93) (dms.)	lb.	——	.12
Extender 600	lb.	——	.1480
FR-162 Latex Extender	gal.	——	1.55
Synprolac	lb.	.16	.23
Synprowax	lb.	——	.23
Vistanex	lb.	——	**.32**


Season's Greetings
SHARPLES CHEMICALS INC.
SHARPLES
TRADE
MARK
CHEMICALS

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite	lb.	.19½	- 1.30
Lionite	lb.	.14	- 1.20
Pumice	lb.	.03	- .05
Aluminum Hydrate	lb.	.07	- .10
Aluminum Silicate			
Marter White	ton	18.50	- 30.00
Barium Carbonate (l.c.l.)	ton	72.50	- 90.00
Barytes			
No. 1 Floated, White	ton	37.60	- 52.40
No. 2 Floated, Unbleached	ton	35.60	- 50.40
No. 22 Barytes (c.l.)	ton	——	- 20.00
Foam A	ton	——	- **34.85**
Bentonite (c.l.)	ton	——	- **11.50**
SPV Velclay (c.l.)	ton	——	- **11.50**
Blanc Fixe	ton	72.50	-120.00
Calcium Carbonate			
Atomite (c.l.)	ton	——	- 30.00
B.I. White No. 1 (c.l.)	ton	——	- 7.50
B.I. White No. 2 (c.l.)	ton	——	- 7.00
Blue Star XX	ton	——	- 15.50
Calcene T	ton	60.00	- 70.00
Caltec	ton	40.00	- 57.50
Calwhite	ton	——	- 17.00
Camelwite	ton	——	- 30.00
Camaco	ton	——	- 30.00
Kalite (c.l.)	ton	——	- 50.00
Laminar	ton	——	- 30.00
Lesamite (c.l.)	ton	——	- 27.50
Millical (c.l.)	ton	——	- 32.50
Multifex	ton	——	-105.00
Non-Fer-Al	ton	——	- 25.00
Purecal M	ton	45.00	- 60.00
U	ton	120.00	-135.00
Sierracal	ton	15.00	- 18.50
Super Multifex	ton	——	-160.00
Surfex (c.l.)	ton	——	- 35.00
Suspenso (c.l.)	ton	——	- 30.00
Witcarb R (c.l.)	ton	110.00	-120.00
R-12 (c.l.)	ton	71.00	- 76.00
York White	ton	——	- 9.50
Calcium Silicate			
Silene EF	ton	120.00	-130.00
L	ton	125.00	-135.00
Calcium Sulfate, Anhydrous			
Snow White Filler	ton	——	- 18.00
Calcium Sulfate, Hydrous			
Crysta-Cal (c.l.)	ton	——	- 12.50
Terra Alba No. 1	ton	12.00	- 14.40
Chalk Whiting (l.c.l.)	lb.	.0150	- .0175
Recco Paris Whiting	ton	——	- 33.00
Clay			
Alsilite (c.l.)	ton	14.00	- 22.50
Alsite (c.l.)	ton	——	- 14.00
Aluminum Flake	ton	22.50	- 60.00
A.S.P. No. 1 (c.l.)	ton	——	- 35.00
No. 11 (c.l.)	ton	——	- 40.00
Buca (c.l.)	ton	——	- 45.00
Burgess No. 20	ton	——	- **35.00**
No. 30	ton	——	- **37.00**
Burgess Iceberg	ton	——	- 50.00
Burgess Polyclay	ton	——	- **45.00**
Catalpo (c.l.)	ton	——	- 35.00
Champion	ton	——	- 14.00
C.S.D. (c.l.)	ton	——	- 13.50
Crown	ton	——	- **14.00**
Dixie (c.l.)	ton	——	- **14.00**
Hi-White R	ton	——	- 13.50
Hydratex R	ton	——	- 30.00
Kaolloid Clay (c.l.)	ton	——	- 10.50
Markham (c.l.)	ton	14.00	- 35.00
McNamee (c.l.)	ton	——	- 13.50
Oldham (c.l.)	ton	13.50	- 35.00
Paragon	ton	——	- 13.50
Pigment 5	ton	21.85	- 36.00
Pigment 22	ton	16.50	- 22.50
Pigment 33	ton	——	- 37.00
Recco (c.l.)	ton	——	- 14.00
RX-43	ton	——	- 33.00
Stan-Clay	ton	25.00	- 30.00
Stellar-R	ton	——	- 50.00
Suprex	ton	——	- 14.00
Upton	ton	19.50	- 23.50
Whitetex (c.l.)	ton	——	- 50.00
Diatomaceous Earth	ton	30.00	- 50.00
Kaylorite (c.l.)	ton	——	- 30.00
Lorite	ton	——	- 30.00
Flock			
Cotton, white and colored	lb.	.10	- .22
Filfloc F 40-9000	lb.	——	- .16
Filfloc F 6000	lb.	——	- .40
Polycel	ton	110.00	- 210.00
Rayon, bleached or dyed	lb.	**.81**	- **1.50**
Rayon, grey	lb.	——	- .18
Rayon, pink	lb.	——	- **.14**
Solka-Floc (l.c.l.)	lb.	.07	- .16
Wool, bleached or dyed	lb.	.70	- 1.00
Glue, Bone (dlvd.)	lb.	.18	- .20½
Leather, Shredded	lb.	.05	- .17
Lignin	lb.	.03	- .06
Indulin	lb.	.09	- .10
Limestone, Pulverized	ton	3.25	- 10.00
Industrial Filler No. 100 ton		——	- 5.75
Micro Velva	ton	45.00	- 48.00
Velvet Filler, Regular	ton	——	- 25.00
Superfine	ton	——	- 27.00
Magnesium Carbonate	lb.	.0950	- .1050
K & M Clearcarb	lb.	.1225	- .1275
Magnesium Oxide	lb.	.05	- .06
Magnesium Silicate	ton	18.00	- 35.00
Airex	ton	25.00	- 27.00
Asbestol	ton	20.00	- 22.00
Blue Star Talc	ton	——	- 23.00
L.S. Silver	ton	**23.50**	- **25.50**
Sierra White	ton	21.25	- **23.25**

FILLERS (Cont'd)

Mica	lb.	.01¾	- .07¾
Concord	lb.	.07	- .07¾
Micro-Mica	lb.	.06¾	- .07½
Mineralite (c.l.)	ton	25.00	- 40.00
Silversheen	lb.	.07	- .07¾
Triple A Mica (c.l.)	ton	——	- 25.00
Vermiculite	lb.	——	- .11
Wet Ground Biotite Mica	lb.	.05½	- .06¼
Wet Ground Mica			
No. 160	lb.	.07	- .07¾
Pyrophyllite			
Pyrax A (c.l.)	ton	——	- 13.50
WA (c.l.)	ton	——	- 16.00
Silica	ton	16.00	- 27.00
Blue Star	ton	——	- 20.60
Slate, Powdered (l.c.l.)	ton	15.00	- 20.00
Talc, Domestic	ton	10.00	- 27.00
Nytal 200	ton	——	- 25.00
300	ton	——	- 36.00
Walnut Shell Flour	ton	45.00	-111.00
Whiting, Commercial	ton	——	- 7.00
Cameline (c.l.)	ton	8.50	- 10.00
C-C-O White	ton	——	- **17.00**
Keystone (c.l.)	ton	——	- 16.00
Rambo No. 1 White	ton	——	- 8.50
No. 6 White	ton	——	- **9.00**
Snowflake (c.l.)	ton	——	- 18.00
Veroc (c.l.)	ton	——	- 8.50
Welco (c.l.)	ton	——	- 7.50
York White R (c.l.)	ton	——	- 8.50
Wood Flour	ton	22.00	- 49.00

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	2.10	- 2.35
Black Out	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.45	- .54
VanWax	gal.	1.45	- 1.50

FLAME RETARDANTS

Celluflux	lb.	.36½	- .38½
Chlorinated Paraffin 42	lb.	——	- .12¼
Halowax	lb.	.24	- .39
Zinc Borate 3167	lb.	.1920	- .2020
Zyrox	lb.	.50	- .79

LUBRICANTS, MOLD

Aquadag	lb.	3.50	- 4.00
Aquarex D	lb.	——	- .80
L Paste	lb.	——	- .94
ME	lb.	——	- .97
MDL Paste	lb.	——	- .33
WA Paste	lb.	——	- .28
Akro Gel	lb.	——	- **.165**
Borax, Granular (l.c.l.)	ton	81.00	- 86.00
Carbowax 4000	lb.	.31	- .35
Colite Concentrate (dms.)	gal.	——	- .90
Concentrex	lb.	——	- **.25**
D:C. 7 Compound	lb.	6.20	- 6.80
D.C. Emulsion No. 35	lb.	1.59	- 3.50
35A	lb.	1.59	- 3.50
35B	lb.	1.59	- 3.50
D.C. Mold Release Fluid	lb.	3.70	- 6.00
Dipex	lb.	.14	- .18
Dri-Lube	lb.	——	- **.22**
Glydag	lb.	1.30	- 2.00
Hawkeye Flake (dlvd.)	lb.	——	- .12
Kokobace	lb.	——	- .12
Latex-Lube GR (dlvd.)	lb.	.18½	- .19¼
R-66 (dlvd.)	lb.	——	- .15
Liqui-Lube (dlvd.)	lb.	——	- .14¾
NF (dlvd.)	lb.	——	- .15¼
NT (dlvd.)	lb.	——	- .15¼
Lubrex	lb.	.25	- .30
Lubri-Flo	gal.	10.00	- 12.00
Migralube	lb.	——	- .35
Mold Lubricant No. 72			
Conc.	gal.	2.50	- 4.00
No. 735	gal.	1.26	- 2.75
Moldeze No. 3	gal.	5.00	- 6.00
Mold-Brite	gal.	——	- 1.50
Mold-Slick	lb.	.253	- .271
Mold-White	gal.	——	- 2.00
Nopcolube	lb.	——	- .15
Orvus WA Paste (dms.)	lb.	——	- .25
Prodag	lb.	.28	- .42
Purity Flake (dlvd.)	lb.	——	- .14
Rubber-Flo	gal.	1.15	- 1.50
Rubber-Glo	gal.	——	- .94
Rusco Mold Paste	lb.	——	- **.25**
Sericite (l.c.l.)	ton	65.00	- 75.00
Thermalube	lb.	——	- .13¾
Ulco Mold Soap	lb.	.12	- .23
Ucon Lubricants	lb.	.27½	- .35½

LUBRICANTS, RUBBER

Extrud-o-Lube	gal.	——	- 1.84
G.B. Naphthenic Neutrals	gal.	.11	- .18
Propylene Stearate (dms.)	lb.	.68	- .78

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.41	- .43
Calcium Stearate	lb.	.39	- .41
Glycerized Lubricant	gal.	——	- 1.48
Polyethylene Glycol	lb.	——	- .23
Rexanol	lb.	——	- .13
Separex	lb.	——	- .25
Slab-Dip	lb.	——	- .15
Wet-Zinc	lb.	——	- .23¼
Zinc Stearate	lb.	.46	- .48

MOLD CLEANERS

Actusol (dlvd.)	gal.	1.40	- 1.60
Metso 99	cwt.	4.00	- 5.85
Granular	cwt.	3.50	- 5.15
Rubber-Sol	gal.	2.75	- 3.25
Shelblast	ton	80.00	-140.00
Sprex A.C. (dlvd.)	lb.	.15¼	- .15½

PEPTIZING AGENTS

Peptizer P-12	lb.	.84	- 1.00
RPA 2	lb.	——	- .75
3	lb.	——	- **.46**
3-RO	lb.	——	- .49
5	lb.	——	- .57

PLASTICIZERS & SOFTENERS

AA (drums)	lb.	.35¼	- .36¼
Acto 500	lb.	——	- .09
Adipol BCA (dms.)	lb.	.43½	- .44
2EH	lb.	.42	- .43
10A	lb.	.42	- .43
American Pine Tar	lb.	.0350	- .0473
Arneel	lb.	.22	- .27
Arolene 1980 (c.l.)	lb.	——	- .10
Aromatic Tar	gal.	.0573	- .1973
Bardol	lb.	.02½	- .03½
B	lb.	.05¾	- .06
Bayol D	gal.	——	- **.382**
F	gal.	——	- **.52**
Beeswax, Refined & Bleached	lb.	.60	- .65
Yellow Refined	lb.	.52	- .55
Bondogen	lb.	.55	- .60
B.R.C. No. 20	lb.	.0150	- .0160
B.R.H. 2	lb.	.0280	- .0290
BRS 700	lb.	.0175	- .0260
B.R.T. 3	lb.	.024	- .025
4	lb.	.0225	- .023
7	lb.	.0265	- .027
B.R.V.	lb.	.0350	- .0515
Bunarex Resins	lb.	.06½	- .07¼
Bunatak AH	lb.	.08	- .09
U	lb.	——	- .15
No. 90	lb.	——	- .08
No. 210	lb.	——	- .12
Burgundy Pitch	lb.	.0843	- .0888
Butac	lb.	.10½	- .11½
Butoxyethyl Diglycol Carbonate	lb.	**.40**	- **.41**
Butyl Benzyl Sebacate	lb.	.61	- .63¾
Butyl Carbitol Perlargonate (dms.)	lb.	——	- **.64**
Butyl Cellosolve Perlargonate (dms.)	lb.	——	- .68
Butyl Palmitate	lb.	——	- .26½
Butyl Roleate	lb.	.176	- .18
Butyl Stearate-CP (dms.)	lb.	.31	- .33¾
BWH-1	lb.	——	- .14
Cabflex Di-BA (dms.)	lb.	.42	- .44¾
Di-OA (dms.)	lb.	.43½	- .46¼
Di-OP (dms.)	lb.	.40	- .42¾
Califlux 510, 550	lb.	**.025**	- **.0325**
G.P.	lb.	.0125	- .02
R-100	lb.	.04½	- .05¼
TT	lb.	.02	- .02¾
Candelilla Wax Prime	lb.	**.67**	- **.75**
Capryl Benzyl Sebacate	lb.	.67½	- .70¼
Carbonex	lb.	**.0325**	- **.0375**
S Flakes	lb.	.04	- .0475
S Plastic	lb.	.0410	- .0460
644	lb.	.0375	- .0425
Carbowax 4000 (drums)	lb.	——	- .29
Cardolite 615	lb.	.33¼	- .36¾
816	lb.	25¾	- .28¾
Carnauba Wax, Crude	lb.	.80	- 1.04
Refined	lb.	.87	- .94
Substitute	lb.	.45	- 1.08
Yellow	lb.	**1.15**	- **1.20**
Celluflex (dms.)	lb.	.34	- .35
Ceresine Wax	lb.	**.14**	- **.36**
Chlorowax 40	lb.	.13	- .15
Contogum	lb.	.06¾	- .10¼
CTLA Polymer	gal.	.17½	- .32½
Cumar Resins	lb.	.05½	- .14½
D.C. 200 Fluid	lb.	4.14	- 6.00
D.B.M.	lb.	——	- .30
Degras, Common	lb.	——	- .12
Dibenzyl Sebacate	lb.	.74	- .76¾
Dibutoxethyl Sebacate	lb.	——	- **.1634**
Dibutyl Phthalate	lb.	.29¼	- .32
Dibutyl Sebacate—Tech.	lb.	.59	- .61¾
C.P.	lb.	.61	- .63¾
Dicapryl Adipate	lb.	.40½	- .43¼
Dicapryl Phthalate	lb.	.37	- .39¾
Dicapryl Sebacate	lb.	.61½	- .64¼
Di-Carbitol Phthalate (dms.)	lb.	.41½	- .42
Dicyclohexyl Phthalate	lb.	——	- .42
Diethyl Phthalate (t.c.)	lb.	——	- .24
Di-2-ethlyhexyl Phthalate (t.c.)	lb.	——	- .37
Dihexyl Adipate	lb.	.33	- .35¼
Dihexyl Phthalate	lb.	.28½	- .31¼
Dihexyl Sebacate	lb.	.50	- .52¾
Di Isobutyl Azelate (dms.)	lb.	.54	- .57
Di-iso-octyl Adipate (dms.)	lb.	.40½	- .43¼
Di-iso-octyl Phthalate (t.c.)	lb.	.37	- .39¾
Dimethyl Phthalate (t.c.)	lb.	——	- .23
Dimethyl Sebacate	lb.	.77	- .79¾
Dioctyl Phthalate (dms.)	lb.	.37	- .39¾
Dioctyl Sebacate (dms.)	lb.	.62½	- .65¼
D.T.O.P. (dms.)	lb.	**.36**	- **.38½**
Dipolymer Oil	gal.	——	- .33

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MAGNESIA
for use with natural
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Genmag Technical—
with neoprene, for scorch resistance.
Extra Light Calcined Magnesia—
for excellent scorch resistance and high tensile, fast cures.
Light Calcined Magnesia No. 101—
low in price; high in effectiveness.
Heavy Calcined Magnesia—
low manganese types in a variety of finenesses.
Magnesia Carbonate—
light, fine and pure.

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MAGNESIA
Oxides and Carbonates Light and Heavy—Tech. and U. S. P. Quality

Have you considered the advantages of Carey Pelletized Oxide of Magnesia packed in Polyethylene Bags—comparatively dust-free, with greater activity, longer package life?

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RMP ANTIMONY
for RED RUBBER
• ATTRACTIVE
• NON-DETERIORATING
RARE METAL PRODUCTS CO.
ATGLEN, PA.

Low Temperature Formulations with
Stamford "FACTICE"® VULCANIZED OIL

Various Grades of Factice as Solid Plasticizers are finding wide use in meeting low temperature specifications in Crude Rubber — GR-S and Neoprene Stocks.

Inquiries Invited.

THE STAMFORD RUBBER SUPPLY CO., STAMFORD, CONN.
Makers of Stamford "Factice"® Vulcanized Oil Since 1900

PLASTICIZERS & SOFTENERS (Cont'd)

Dispersing Oil No. 10	lb.	.05½ -	.05¾
Dutrex B	lb.	.02¾ -	.03¾
5 and 6	lb.	.020 -	.031
15E	gal.	.10 -	.20
20, 21, 22 and 25	lb.	— -	.04
ELA		— -	.80
Elastex 10-P	lb.	.40 -	**.42½**
50-B	lb.	**.34½** -	**.37**
DCHP	lb.	**.42½** -	**.43½**
Estac		— -	**.16**
Ethox (dms.)	lb.	.41¼ -	.42
Flexol B-400	lb.	.27 -	.29
DHP	lb.	.35 -	.37½
DOP	lb.	.37 -	.39½
TOF	lb.	.41½ -	.44
3GH	lb.	.42 -	.44
3GO	lb.	.51½ -	.53½
4GO	lb.	.36 -	.38½
8HP	lb.	.38 -	.40½
Galex W-100	**lb.**	**.13½** -	**.15**
G. B. Light Process Oil	**lb.**	**.025** -	**.0325**
G. B. Naphthenic Neutrals	gal.	.11 -	.18
Good-Rite GP233	gal.	.45 -	.47¾
GP261	gal.	.40 -	.42¾
Harflex 500 (dms.)	lb.	.36½ -	.39¼
Hercolyn (dlwd.)	lb.	.16 -	.16½
Herron-H.T.	gal.	.16 -	.27
Herron-Plas	lb.	— -	.03¾
Herron-Wax	lb.	.05¼ -	.06
No. 23	lb.	.08¼ -	.08¾
No. 24	lb.	.07¾ -	.07¾
HSC No. 13	lb.	.27 -	.30
Hylene B	lb.	.45 -	.50
C	lb.	.41 -	.46
D	lb.	.47½ -	.52½
Indonex 632½ (633½, 634½, 638½)	gal.	.1100 -	.1700
Kapsol	lb.	.35½ -	.36
Kenflex	lb.	.19 -	.27
KP 23 (dms.)	lb.	.31½ -	.32½
70 (dms.)	lb.	.34 -	.34½
120 (dms.)	lb.	.37½ -	.38
140 (dms.)	lb.	.45½ -	.46
150 (dms.)	lb.	.29 -	.30
201	lb.	.41½ -	.42
Kremol 40	gal.	.36 -	.46
50	gal.	.36 -	.46
Kronisol (drums)	lb.	.35 -	.35½
Kronitex (drums)	lb.	.31½ -	.32½
Lanolin, Tech. Anydrous	lb.	.21 -	.23
Lead Oleate	lb.	— -	.30¼
Lindol (dms.)	lb.	.34 -	.35
2-Mercaptoethanol (drums)	lb.	— -	**.75**
Methox (dms.)	lb.	.36½ -	.37
Methyl Laurate	lb.	.25 -	.27
Methyl Oleate	lb.	— -	.20
Methyl Stearate (dms.)	lb.	— -	.30
Modicol G	lb.	— -	.23
R	lb.	— -	.17
Montan Wax, Crude	lb.	.15 -	.18
Monten Wax	lb.	.12 -	.13
Monty Wax	lb.	— -	.30½
Morflex No. 100	lb.	.37 -	.38¼
Natac	lb.	.10 -	.11
Neolene 210 (t.c.)	lb.	— -	.16
212 (t.c.)	lb.	— -	**.14**
220 (t.c.)	lb.	— -	.15
Nerium	lb.	— -	.09
Nevillac Resins (dms.)	lb.	.23 -	**.45**
Neville Resins (dms.)	**lb.**	**.10½** -	**.15½**
Nevindene Resins (dms.)	lb.	**.12½** -	**.15½**
Nevinol (dms.)	lb.	— -	**.17**
Nevoil	lb.	.02¼ -	.03¼
Nevtex 10 (dms.)	lb.	.08¾ -	.10¼
Nuba I (and 2) (dms.)	lb.	— -	**.04**
3X (dms.)	lb.	.05¾ -	.06¼
15 (and 30) Oil (dms.)	lb.	.36¼ -	.38
No. 480 Oil Proof Resin	lb.	— -	.18
Ohopex Q10 (dms.)	lb.	.36½ -	.37¼
Opalwax	**lb.**	**.37** -	**.38**
Ortho-Nitrobiphenyl	**lb.**	**.06** -	**.11**
Ozokerite Wax No. 64 White	lb.	.31 -	.32
Yellow	lb.	.25 -	.26
P-1 (and 4)		.40 -	.41¼
P-4C	lb.	— -	.37½
P-8	lb.	— -	.26¼
Pale 4 (and 1000)	lb.	.35¼ -	.37¼
Palm Oil	lb.	— -	**.11**
Paralene Resins (dms.)	lb.	.05 -	**.06**
Para Flux (dms.)	gal.	.1825 -	.1925
2016 (dms.)	gal.	.22 -	.23
Para Lube (t.c.l.)	lb.	.046 -	.048
Parmo	lb.	.06 -	.13½
Pepton 22	**lb.**	**.72** -	**.75**
PG-16 (drums)	lb.	— -	.22¼
Picco 10 (and 25)	lb.	— -	.13½
75 (and 100)	lb.	— -	.13
Rubber Resin 100	lb.	.1855 -	.1905
S.O.S.	gal.	— -	.29
Piccocizer 30	lb.	— -	.03½
Piccolastic A (and B, C, D, E)	lb.	.28½ -	.29
FT, FHF and FX	lb.	— -	.1815
T-135	lb.	.22¾ -	.23¼
Piccolyte S Resins	lb.	.18½ -	.20
Piccolyte WW Resins	lb.	.45 -	.47
Piccoumaron Resins	lb.	.06¾ -	.17
Piccovar	lb.	.14½ -	.15
Piccovol	lb.	— -	.02½
Pictar	gal.	— -	.25
Pigmentar	lb.	.0410 -	.0655

PLASTICIZERS & SOFTENERS (Cont'd)

Pigmentaroil	lb.	.0410 -	.0655
Plastac M	**lb.**	— -	**.09¼**
Plasticizer 2286	lb.	— -	.26¼
Plasticizer SC	lb.	**.49** -	**.52**
Plasticizer VA-1	lb.	— -	**.40**
Plasticizer W-13	lb.	.37 -	.38¾
Plasticizer XP-3	lb.	— -	**.50**
Plastoflex 50	lb.	.26½ -	.29
52	lb.	.31 -	.32½
VS	lb.	.40 -	.42½
Plastogen	lb.	.07¾ -	.08
Plastolein 9050 (c.l.)	lb.	— -	.48
9055	lb.	— -	.39
9058	lb.	— -	.47
9250	lb.	— -	.31
9715	lb.	— -	.38
9720	lb.	— -	.30½
Plastone	lb.	.27 -	.30
Polycin 781	lb.	.40 -	.41
Polymel C-128	lb.	.19½ -	.20½
D	lb.	.22 -	.24
H-2	lb.	.22 -	.24
6	lb.	.06¾ -	.10
7	gal.	.23 -	.28
Process Oil C-255 (c.l.)	gal.	— -	.22
Propylene Stearate (dms.)	lb.	— -	.32
PT 400 Pine tar (600, 800) (t.c., dms.)	lb.	.0410 -	.0534
PX-104	lb.	.34 -	.42
PX-108	lb.	.38 -	.46
PX-208	lb.	.41½ -	.49
PX-404	lb.	.60 -	.68
Reogen	lb.	.13½ -	.13½
465 Resin (drums)	lb.	.05 -	.05½
Resin 731-C	cwt.	— -	13.50
Resin C	lb.	.0200 -	.0285
Resinex	lb.	.03¼ -	.03¾
L-4	lb.	.02¼ -	.03
Rexflex	lb.	— -	.15
Rosin Oil	gal.	.54 -	1.20
R.P.A. No. 2	lb.	— -	**.65**
No. 3	lb.	— -	**.46**
No. 5	lb.	— -	**.57**
R.S.O. Softening Oil	lb.	**.03** -	**.05**
Rubberol	lb.	— -	.25¼
Rubtar	gal.	— -	.40
Santicizer B-16	lb.	.50 -	**.52**
E-15	lb.	.47 -	.49
M-17	lb.	.44 -	.46
No. 107	lb.	.40 -	.42½
No. 140	lb.	.29 -	.31
No. 141	lb.	.40 -	.42¾
No. 160	lb.	.34 -	.36
Sherolatum	lb.	.02¾ -	.05½
Softener No. 20	gal.	**.09** -	**.25**
Staflex IXA	lb.	.34 -	.36
Stanolind Petrolatum	lb.	**.037** -	**.081**
Wax	lb.	**.25** -	**.30**
Staybelite Resin (dms.)	cwt.	— -	9.00
Sunny South Burgundy Pitch	lb.	.1009 -	.1054
Sunny South Pine Tar	lb.	.0410 -	.0655
Sunny South Rosin Oil	gal.	.58 -	.86½
Superla Wax	lb.	**.25** -	**.30**
Syncera Wax	lb.	**.175** -	**.225**
Syn Tac (c.l.)	gal.	— -	.33
Synthetic Revertant Oil	lb.	— -	.16
Tar, Refined	gal.	.12 -	.17
K-Tarnel NR (t.c.)	lb.	— -	.0851
Terpene A	gal.	— -	.65
TP-90B	lb.	— -	.67
TP-95	lb.	— -	.65
TP-98	lb.	— -	.65
Triacetin	lb.	**.34** -	**.45**
Tricresyl Phosphate	lb.	.30 -	.32½
Turgum S	lb.	.08¾ -	.09¾
Vanadiset A	gal.	**.13** -	**.20**
Vistac No. 1	gal.	1.00 -	1.16
No. 2 (c.l.)	gal.	1.22 -	1.26
No. 4 (c.l.)	gal.	1.32 -	1.36
P	lb.	— -	.17
Vopcolene 50	lb.	— -	.17
Witresin—Granular	ton	41.00 -	43.00
Solid	ton	36.00 -	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	— -	.21
Refined (drums)	lb.	— -	.19½
Castorwax (min. 250 lbs.)	lb.	— -	.27¼
Dutrex 7	lb.	.12 -	.20
Millrex	**lb.**	— -	**.15**
Resin No. 510	lb.	.13½ -	.16½
Zyrox	lb.	.50 -	.79

PROTECTIVE & STABILIZING AGENTS

Acacia	lb.	.12¼ -	**.21**
Alpha Protein	lb.	.24 -	.28
Ammonium Alginate	lb.	— -	.95
Arcostoocrat	lb.	— -	.07½
Carob Bean Flour	lb.	— -	.46
Casein	lb.	.28 -	.38
Ethylene Diamine 68%	lb.	.57 -	.58
Karaya Gum	lb.	.20 -	.50
Prosein	lb.	.0600 -	.0630
Rex Compound No. 2801	lb.	— -	**.15**
Stablex B	lb.	.50 -	.95
K	lb.	.27 -	.35
Tragacanth Flakes	lb.	**.60** -	**1.35**

RECLAIMING AGENTS

Armeens C	lb.	.50 -	.58
T	lb.	.42 -	.50
No. 517 H.B. Oil	**gal.**	**.11½** -	**.16½**
535	gal.	**.22** -	**.27**
C-6 Oil (and 28, 32)	**gal.**	**.33** -	**.38**
C-10 Oil	**gal.**	**.25** -	**.30**
C-33 Oil	gal.	— -	.21½
Caustic Soda—Flake 76% (c.l., drums)	cwt.	— -	3.60
Liquid 50% (t.c.l.)	cwt.	— -	2.40
Solid 76% (c.l., dms.)	cwt.	— -	3.20
Cresylic Acid (99-100%)	gal.	1.20 -	1.39
D-4	gal.	— -	.27
E-5	gal.	— -	.25
G. B. Reclaiming Oil	**gal.**	**.12** -	**.18**
Heavy Aromatic Naphtha (t.c.)	gal.	— -	.12¼
LX-27 Reclaiming Solvent	gal.	.21 -	.30
LX-572 Reclaiming Oil	**gal.**	**.23** -	**.28**
Neo-Fat D-242	lb.	.05½ -	.07¾
PRR 1	gal.	.15 -	.35
PT 67 Light pine oil	gal.	.50 -	.60
PT 101 Pine tar oil	lb.	.0410 -	.0534
Q Oil	gal.	— -	.286
Reclaiming Oil 1621	**lb.**	**.03** -	**.04**
Reclaiming Oil 3186 (t.c.)	gal.	.28 -	.38½
Reclaiming Oil 3186-G	gal.	.25 -	.36½
Reclaiming Reagent No. 4	lb.	.12 -	**.15**
R.P.A. No. 3	lb	— -	**.46**
Soda Ash (c.l., bags)	cwt.	— -	1.40
Solvenol 1 (dms.)		— -	.36
Solvent 534	gal.	.20½ -	.26½
Solvent Oil 21	gal.	**.24** -	**.29**
C-42	gal.	.23 -	**.28**
Union Solvent 4060-O	gal.	— -	.147
X-1 Resinous Oil	lb.	.0190 -	.0285
X-60 Solvent	gal.	**.24** -	**.32**

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0740 -	.1225
Continental F	lb.	.0740 -	.1225
Croflex	lb.	.0740 -	.1225
Dixiedensed (and S)	lb.	.0740 -	.1225
Kosmobile (and S)	lb.	.0740 -	.1225
Micronex HPC	lb.	.0740 -	.1225
Spheron 4	lb.	.0740 -	.1225
Witco Disperso No. 6	lb.	.0740 -	.1225

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0740 -	.1225
Continental A	lb.	.0740 -	.1225
Croflex TH	lb.	.0740 -	.1225
Dixiedensed HM (and S-66)	lb.	.0740 -	.1225
Huber Arrow TX	lb.	.0740 -	.1225
Kosmobile HM (and S-66)	lb.	.0740 -	.1225
Micronex Standard	lb.	.0740 -	.1225
Spheron 6	lb.	.0740 -	.1225
Texas M	lb.	.0740 -	.1225
Witco Disperso No. 1	lb.	.0740 -	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0740 -	.1225
Continental AA	lb.	.0740 -	.1225
Croflex 77	lb.	.0740 -	.1225
Dixiedensed 77	lb.	.0740 -	.1225
Kosmobile 77	lb.	.0740 -	.1225
Micronex W-6	lb.	.0740 -	.1225
Spheron 9	lb.	.0740 -	.1225
Texas E	lb.	.0740 -	.1225
Witco Disperso No. 12	lb.	.0740 -	.1225
Wyex	lb.	.0740 -	.1225

Channel, Conductive (CC) (bags)

Continental R-40	lb.	.1800 -	.2400
Dixie 5 Dustless	lb.	.0950 -	.1550
Dixie Voltex	lb.	.1950 -	.2500
Kosmink Dustless	lb.	.0950 -	.1550
Kosmos Voltex	lb.	.1950 -	.2500
Spheron C	lb.	.2400 -	.1850
Spheron N	lb.	.2500 -	.3000
Voltex	lb.	.1800 -	.2150

Furnace, Fast Extruding (FEF) (bags)

Croflex 50	lb.	.0600 -	.1000
Dixie 50	lb.	.0600 -	.1000
Kosmos 50	lb.	.0600 -	.1000
Statex M	lb.	.0600 -	.1000
Sterling SO	lb.	.0600 -	.1000

Furnace, General Purpose (GPF) (bags)

Sterling V	lb.	.0500 -	.0900

Furnace, High Modulus (HMF) (bags)

Continex HMF	lb.	.0550 -	.0950
Croflex 40	lb.	.0550 -	.0950
Dixie 40	lb.	.0550 -	.0950
Kosmos 40	lb.	.0550 -	.0950
Modulex	lb.	.0550 -	.0950
Statex 93	lb.	.0550 -	.0950
Sterling L	lb.	.0550 -	.0950

Furnace, Medium Abrasion (MAF) (bags)

Philblack A	lb.	.0600 -	.1000

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.0400 -	.0800
Croflex 20	lb.	.0400 -	.0800
Dixie 20	lb.	.0400 -	.0800
Essex	lb.	.0400 -	.0800
Furnex	lb.	.0400 -	.0800
Gastex	lb.	.0450 -	.0850
Kosmos 20	lb.	.0400 -	.0800
Pelletex	lb.	.0400 -	.0800
Sterling NS	lb.	.0400 -	.0800
Sterling R	lb.	.0450 -	.0850
Sterling S	lb.	.0400 -	.0800

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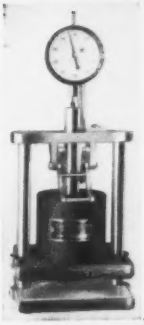

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REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Fine (FF) (bags)

Statex B	lb.	.0650 -	.1050
Sterling 99	lb.	.0650 -	.1050

Furnace, High Abrasion (HAF) (bags)

Aromex	lb.	.0790 -	.1250
Continex HAF	lb.	.0790 -	.1250
Croflex 60	lb.	.0790 -	.1175
Dixie 60	lb.	.0790 -	.1175
Kosmos 60	lb.	.0790 -	.1175
Philblack O	lb.	.0790 -	.1190
Statex R	lb.	.0790 -	.1250
Vulcan 3	lb.	.0790 -	.1220

Furnace, Very Fine (VFF) (bags)

Statex K	lb.	.0790 -	.1250

Thermal, Fine (FT) bags)

P-33 (c.l.)	lb.	— -	.0550

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	— -	.0350
Thermax, Stainless (c.l.)	lb.	— -	.0450

REINFORCING AGENTS—SILICA

Hi-Sil	lb.	.11 -	.12½

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.42 -	.44
X34	lb.	.37 -	.39
X43 (and 43E)	lb.	.38 -	.40
Darex Copolymer Latex No. 3 (and X34)	lb.	.36½ -	.50
Durez 12687 (and 12707)	lb.	— -	.32
Durez 13355	lb.	— -	.26
Good-Rite Resin 50	lb.	.41 -	.43
Kralac A	lb.	.39 -	.40
Marbon S and S-1	lb.	.35 -	.48
8000	lb.	.41 -	.48
Marmix	lb.	.41 -	.48
Pliolite Latex 190	lb.	.30 -	.34
Pliolite NR	lb.	.74 -	.76
Pliolite S6 (and S6B) Resin	lb.	.36 -	.37
C-3 Masterbatch	lb.	.47 -	.48
C-4 Masterbatch	lb.	.45 -	.46
G Masterbatch	lb.	.35 -	.36
G50 Masterbatch	lb.	.35 -	.36
N Masterbatch	lb.	.40 -	.41
R Masterbatch	lb.	.43 -	.44
Polyco 220	lb.	.13 -	.15

RETARDERS

Dutch Boy Normasal	lb.	— -	.48½
ESEN	lb.	— -	.36
Retarder ASA	lb.	— -	.55
Retarder PD	lb.	.34 -	.36
Retarder T.C.M.	lb.	— -	.65
Retarder W	lb.	— -	.43
Retardex	lb.	.47 -	.50

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	38.00 -	40.00
Black Diamond	ton	38.00 -	40.00
Byerlyte	ton	47.00 -	54.00
Gilsonite, Selects (c.l.)	ton	33.50 -	36.00
Hard Hydrocarbon (dms.)	ton	46.50 -	48.50
Herron Flake	ton	— -	45.00
Mineral Rubber, solid	ton	42.50 -	44.50
Pioneer	ton	35.00 -	46.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.29 -	.36
Brown	lb.	.1425 -	.2680
Dispersed	lb.	.26 -	.42
Neophas	lb.	.1370 -	.2680
White	lb.	.1440 -	.2850

Miscellaneous Rubber Substitutes

G.B. Asphaltenes	lb.	.06 -	.06½
Gilsowax B	lb.	.09 -	.11
Resin No. 1098 (drums)	lb.	— -	.62
No. 1198	lb.	.46¾ -	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.08½ -	.11
American Dipentine	gal.	.47 -	.68
American Pine Oil	gal.	.75¾ -	.95½
Amsco Lactol Spirits (t.c.)	gal.	— -	.17
Rubber Solvent (t.c.)	gal.	— -	.16
Solv A (t.c.)	gal.	— -	.21½
Solv A-80 (t.c.)	gal.	— -	.26
Solv B (t.c.)	gal.	— -	.25
Solv B-90 (t.c.)	gal.	— -	.28½
Solv D (t.c.)	gal.	— -	.25¾
Special Naphthalite (t.c.)	gal.	— -	.16
Textile Spirits (t.c.)	gal.	— -	.17
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	.10 -	.11
Aromatic Solvent 40	gal.	— -	.219
Benzol 90%	gal.	.17 -	.24
Butyl Acetate (t.c.)	lb.	.13 -	.175
Butyl Alcohol (t.c.)	lb.	.13 -	.175
Secondary (dlvd.)	lb.	.11 -	.13½
Tertiary (dlvd.)	lb.	12 -	.14½
Carbon Bisulfide, Tech.	lb.	.0440 -	.0800
Carbon Tetrachloride	lb.	.08 -	.08½
Cosol 1	gal.	.30 -	.38
Cosol 2	gal.	.30 -	.38
Cyclohexane	lb.	.09¼ -	.11¾
Cyclohexanone	lb.	.25 -	.27 a
Diacetone, Pure (dlvd.)	lb.	.12 -	.14½

SOLVENTS (Cont'd)

Dichlorethyl Ether (dms.)	lb.	.165 -	.17
Formal (dms.)	lb.	.265 -	.27
Dichloropentane (l.c.l.)	lb.	.04 -	.07
Dicom	gal.	.30 -	.42
Dipentene 122 (dms.)	gal.	.35 -	.36
Halowax Oil	lb.	.25 -	.37
Heptanes (t.c.)	gal.	.17 -	.22
Hexalin Cyclohexanol	lb.	.20 -	.22 a
Hexanes (t.c.)	gal.	.17 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.47 -	.64
Ether, Ref. (dlvd.)	gal.	.05 -	.07½
Mesityl Oxide (dlvd.)	lb.	.11½ -	.14
Methyl Acetone, Syn. (drums, dlvd.)	gal.	.615 -	.65
Methyl Ethyl Ketone	lb.	.11 -	.13½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13 -	.15½
N-5 Pentane Mix. (t.c.)	gal.	— -	.13½
N-6 Hexanes (t.c.)	gal.	— -	.14
N-7 Hexanes (t.c.)	gal.	— -	.13
Penetrell	gal.	.47 -	.68
Petrolene (t.c.)	gal.	— -	.13125
Picolines, Alpha, Refined	lb.	— -	.40
Mixed	lb.	— -	.30
Proprietary Alcohol (t.c.)	gal.	— -	.43½
Pyridine, Refined	lb.	— -	1.05
Quinoline	gal.	— -	.61¾
Rubber Solvent (t.c.)	gal.	— -	.16
Rubsol (t.c.)	gal.	— -	.11875
Skellysolve B (Hexanes) (t.c.)	gal.	— -	.148
C (Heptanes) (t.c.)	gal.	— -	.141
E (Octanes) (t.c.)	gal.	— -	.155
R (Solvent Naphtha)	gal.	— -	.114
Solvenol (dms.)	gal.	— -	.36
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100 (t.c.)	gal.	— -	.28
150 (t.c.)	gal.	— -	.28
Sunny South Dipentine	gal.	.47 -	.68
Sunny South Pine Oil	gal.	.75½ -	.95½
Toluene (drums)	gal.	— -	.28
Tolulol (t.c.)	gal.	— -	.30
Trichlorethane	lb.	.11 -	.12
Triglycol Dichloride (dms)	lb.	.53 -	.54
Tromex	lb.	.078 -	.083
Union Thinner 1	gal.	— -	.161
3	gal.	— -	.161
7	gal.	— -	.151
2-50-W Hi-Flash	gal.	— -	.38
X-7 Sp. Heptanes (t.c.)	gal.	— -	.11

STABILIZING AGENTS (for Vinyl Resins)

Basic Silicate White Lead	lb.	.1715 -	.1815
No. 201	lb.	.2271 -	.2371
BVS	lb.	— -	.5834
Cadmium Stearate	lb.	— -	1.25
Dutch Boy DS-207	lb.	— -	.56
Plumb-O-Sil A	lb.	— -	.31¼
B	lb.	— -	.32¾
Trilase	lb.	— -	.29¼
Dythal	lb.	— -	.42½
Lead Stearate, Precip.	lb.	.36 -	.38
Fused	lb.	— -	.35½
Lithium Stearate	lb.	.63 -	.65
Stabelan E	lb.	1.25 -	1.40
XL	lb.	.55 -	.65
Stabilizer No. 3	lb.	— -	2.00
Stabilizer No. 21	lb.	— -	.90
Stabilizer No. 52	lb.	— -	2.00
Stabilizer E6B	lb.	— -	.85
Stabilizer JCX	lb.	— -	.49
Stabilizer L	lb.	— -	.60
Stabilizer SN	lb.	— -	.42
Stabilizer V-1-N	lb.	— -	.50
Stabilizer V-9	lb.	— -	.85
Stabilizer V-7939	lb.	— -	.60
Vanstay L	lb.	.33 -	.35
H	lb.	.75 -	.77

STIFFENING AGENTS

Calco S. A.	lb.	.80 -	.83

SUN CHECKING AGENTS

Antisol	lb.	— -	.23
Antisun	lb.	— -	.21
Heliozone	lb.	.25 -	.26
Sharples Wax	lb.	.23 -	.28
Sunolite	lb.	.20 -	.23
Sunproof	lb.	.25½ -	.26
Imp.	lb.	.23† -	.24
Jr.	lb.	.18 -	.19
Tonox	lb.	.50 -	.52

TACKIFIERS

Advaresin 100	lb.	.13½ -	.14
Arcco 493-49B	lb.	.15 -	.17
700-25A	lb.	.14 -	.16
U2-24	lb.	.11 -	.13
Galex (drums)	lb.	.15¼ -	.19¼
Indopol H-300 (bbls.)	gal.	1.12 -	1.16
Koresin	lb.	.73 -	.75
Liquid Rubber Flux	lb.	— -	.14
Nilox	cwt.	12.50 -	13.50
Pentalyn A (dlvd.)	lb.	.12½ -	.13
Resin V	lb.	— -	.23¼
Rubtack	lb.	— -	.12
Staybelite Ester No. 10 (dlvd.)	lb.	.19¾ -	.20¾
Synthol	lb.	— -	.24¾
Vistac No. 1	gal.	1.00 -	1.16
No. 2 (c.l.)	gal.	1.22 -	1.26
No. 4 (c.l.)	gal.	1.32 -	1.36
A	lb.	— -	.20¼
Zirex	cwt.	12.00 -	12.80

THICKENERS (FOR LATEX)

Alcogum AN-6	lb.	— -	.05
AN-10	lb.	— -	.08¼
Betanol (drums)	lb.	— -	.70
Emulsorex No. 5	lb.	— -	.35
Lecithin	lb.	.12 -	.17
Modicol VD	lb.	— -	.12¼
VE	lb.	— -	.10¾
VF	lb.	— -	.10¾
VK	lb.	— -	.07
Polyco 296	lb.	.13 -	.13½
Propylene Laurate (dms.)	lb.	.57 -	.67
Sodium Silicate	cwt.	1.50 -	2.65

VULCANIZING AGENTS

Selenium

Ancasal*	lb.	— -	2.00
Vandex	lb.	— -	3.50

Sulfur

Blackbird	cwt.	— -	2.30
Crystex	lb.	.19½ -	.23
Darex Dispersed Sulphur	lb.	.12 -	.17
Dispersed Sulfur	lb.	.12 -	.14
Devil (c.l.)	cwt.	— -	1.75
Insoluble Sulfur 60	lb.	.12½ -	.13
Spider	cwt.	— -	2.30
Star (c.l.)	cwt.	— -	2.25
Tire (c.l.)	cwt.	— -	1.75
Tube	cwt.	— -	2.25

Tellurium

Ancatel*	lb.	— -	2.00
Telloy	lb.	— -	2.50

WASHING & FINISHING AGENTS

Apcolene (t.c.)	gal.	— -	.12375

WETTING AGENTS

Advawet No. 10	lb.	— -	.35
No. 15	lb.	— -	.20½
No. 33	lb.	— -	.39
Aerosol OT 70% Clear	lb.	.80 -	1.00
Alrosol (dms.)	lb.	— -	.40
Alrosperse	lb.	— -	.18
Aquarex D	lb.	— -	.80
MDL Paste	lb.	— -	.33
ME	lb.	— -	.97
NS	lb.	— -	.60
WA Paste	lb.	— -	.28
Areskap 50	lb.	.30 -	.38
Dry 100	lb.	.60 -	.72
Aresket 240	lb.	.30 -	.38
Dry 300	lb.	.60 -	.72
Areaklene 375	lb.	.42 -	.57
Dry 400	lb.	.70 -	.84
Armacs	lb.	.29 -	.76
Arquads	lb.	.21 -	.61
Etho-chemicals	lb.	.34 -	.80
Lecithin	lb.	.18 -	.26
Modicol L	lb.	— -	.58
N	lb.	— -	.40
S	lb.	— -	.22
Nopco 1086-A	lb.	.42 -	.50
1187-X	lb.	— -	.14½
Parnol	lb.	.13 -	.18
Santomerse D	lb.	.44 -	.65
S	lb.	.13 -	.25
Sorbit P	lb.	— -	.25
Stablex G	lb.	.50 -	.70
Tergitol 4 (dms., dlvd.)	lb.	— -	.30
7 (dms., dlvd.)	lb.	— -	.37
O8 (dms., dlvd.)	lb.	— -	.30
P28 (dms., dlvd.)	lb.	— -	.19
Trenamine W-30	lb.	— -	.15
Vultamol	lb.	— -	.17½
Wetsit Conc.	lb.	.25 -	.32

MISCELLANEOUS CHEMICALS

Acto 450 (550-W, 600, 630)	lb.	.109 -	.145
Agchem SA-17	lb.	— -	.29
Aquarex SMO	lb.	— -	.50
A.S.T.M. Oil No. 1 (and No. 3)	gal.	1.00 -	1.15
Copper Inhibitor X-872-L	lb.	— -	1.95
D-Tac	lb.	.21 -	.23
2-Ethylhexanol (dms.)	lb.	.25 -	.26
MODX	lb.	.295 -	.345
NBC	lb.	— -	1.50
Para Resin No. 2457 (c.l.)	lb.	— -	.04
No. 2718 (c.l.)	lb.	— -	.04
Pigmented Filmite	lb.	— -	.16½
Polyvinyl Methyl Ether	lb.	— -	1.00
Reference Fluid SR-6	gal.	.85 -	1.00
SR-10	gal.	.60 -	.75
Resin No. 1226	lb.	.31½ -	.36½
Rio Resin	lb.	.52 -	.54
RR-10	lb.	— -	.35
Santocel	lb.	— -	.50
Sherosope L, N, F-445 and P	lb.	.12½ -	.15
Sublac B2	lb.	.26 -	.28
PX-5	lb.	.26 -	.28
Syntep N (drums)	lb.	— -	.54
Thiokol LP-2	lb.	— -	.96
LP-3	lb.	— -	.96
LP-8	lb.	— -	1.25
Tysonite	lb.	.24 -	.24¾
Vanfre	gal.	2.50 -	3.00
Vinsol Resin—Lumps	cwt.	— -	3.25

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CHEMICAL ENGINEER: Age thirty-one. Statistical quality control experience in the rubber industry. Factory trouble-shooting mechanical goods. Seeking position leading to that of "Manager of Inspection and Quality Control" small to medium size company. Address Box 260-P, RUBBER AGE.

GRADUATE CHEMIST and TECHNOLOGIST: Fifteen years experience rubber and plastic cables, mechanicals, technical sales and management, desires new position in responsible capacity, or technical sales with company merchandising raw materials. Address Box 275-P, RUBBER AGE.

RUBBER DEVELOPMENT CHEMIST and COMPOUNDER: Fifteen years on compounding research and process development in tire field. Available for development position in rubber or allied fields. Address Box 276-P, RUBBER AGE.

SALES REPRESENTATIVE: 25 years of sales experience here and abroad, wish to represent company producing mechanical, sanitary and miscellaneous products. Pacific Coast area preferred. Am also willing to travel abroad, if necessary. Interested in permanent position only. First class references exchanged. Address Box 282-P, RUBBER AGE.

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SPONGE RUBBER CHEMIST: Excellent opportunity for man with experience and ambition. Permanent position with established firm located in Pennsylvania. Salary open. Submit detailed resume of business experience and personal qualifications first letter. Address Box 249-W, RUBBER AGE.

WELL ESTABLISHED EXPANDING manufacturer of hard rubber and plastic molded products in Trenton, New Jersey, has openings for the following technical personnel:

ANALYTICAL CHEMIST—to establish inorganic testing procedures, gravimetric and volumetric, and assume responsibilities for supervising analytical testing unit.

CONTROL CHEMIST—to test and follow up raw materials in-process batches and finish product quality. Should have ability to deal with people.

DEVELOPMENT CHEMIST—to do development and pilot plant work on rubber and plastic products. Should be capable of original thinking and practical application.

These positions are permanent and offer excellent opportunities for advancement. Young men with the ability to grow are preferred. Please submit resume including education, experience, salary requirement. Address Box 256-W, RUBBER AGE.

HELP WANTED (Continued)

RUBBER TECHNICIAN: Experienced in flat belting or hose. Prefer man with good knowledge of use of synthetic fibers in these products. Excellent opportunity with established firm in New Jersey. Reply stating educational and experience background with starting salary. Address Box 258-W, RUBBER AGE.

RUBBER CHEMIST: With experience, to carry on independent compounding for flat belting, hose and packing. Excellent opportunity with old well established manufacturer located in New Jersey. State age, technical background, experience and salary requirements in first letter. Address Box 259-W, RUBBER AGE.

CABLE DESIGN ENGINEER: Electrical engineer experienced with specifications, design development, and production of insulated wire and cable. Write giving details on education, experience and salary. Address Box 261-W, RUBBER AGE.

RUBBER TECHNOLOGIST—Chemist or Chemical Engineer: Large Eastern supplier has opening for permanent position in its Rubber Laboratory for recent college graduate with up to five years' industrial experience in mechanical goods, sundries, wire, tires, or latex. Practical experience in factory processing and compounding essential so that laboratory results can be readily interpreted and demonstrated to customers. Position offers excellent opportunities for advancement in either sales or development compounding. Progressive management encourages publication of experimental work. This, coupled with laboratory having finest equipment and staffed with highest type of trained technicians, assures successful applicant of ample opportunity to demonstrate ingenuity and ability. Position also offers opportunity for some travel and for contacts with the rubber industry. Write, giving in full detail, age, education, and experience. Replies held strictly confidential. Our employees know of this ad. Address Box 263-W, RUBBER AGE.

SALES MANAGER: Small progressive molded goods manufacturer in New England has opening for energetic man. Must have ability and contacts. Excellent opportunity for producer. Submit detailed resume giving date available. Present staff acquainted with this advertisement. All replies confidential. Address Box 265-W, RUBBER AGE.

Man under forty with experience in rubber and synthetics to be CHEMIST in CHARGE of laboratory of small but progressive and well-established manufacturer of molded products and specialties. Must be capable of developing new formulations and improving present ones. Fine opportunity for right man. All replies held strictly confidential. Address Box 266-W, RUBBER AGE.

RUBBER TECHNOLOGIST: Wanted for technical work involving writing and liaison in the general field of rubber. About five years broad experience desirable. Interesting opportunity in Southwest. Our employees know of this advertisement. Apply to P. O. Box 2296, San Antonio 6, Texas.

RUBBER CHEMIST: Experienced formulator. Latex compounding, rubber cements, vinyl solutions, synthetic resins, emulsions, water solubles for industrial adhesives, coatings, finishes, combining laminating, coated fabrics and papers, etc. Old established company in Philadelphia area. Address Box 278-W, RUBBER AGE.

CHEMISTS or CHEMICAL ENGINEERS: Recent graduates for training program, associated with Polymer Chemistry. Give complete details in first letter. Plant located in Central New Jersey. Address Box 279-W, RUBBER AGE.

WANTED: A compounder experienced in shoe factory products other than adhesives, either on full time or consulting basis, mid-western location. Medium sized growing organization. Address Box 281-W, RUBBER AGE.

HELP WANTED (Continued)

WANTED

TWO MEN enough interested in "Tomorrow" to answer this advertisement "Today."

It's strictly against the policy of this midwest industrial rubber products manufacturer to go outside its own organization for executive personnel, but a new plant addition for the manufacturing of wire-braid, lead press hose makes this move necessary.

We need two men to head up this program.

an

EXPERIENCED CHEMIST

and a

HOSE DEPARTMENT SUPERINTENDENT

The men selected must have had considerable experience in the production of wire-braid, lead press hose, plus the ability to start from scratch with a new building and new equipment to build a high quality product.

If you qualify for either of these positions . . . and want to build a future in a medium-size midwestern city . . . write us now. Give us full facts about your experience, age, education and salary requirements.

Box 267-W, RUBBER AGE

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Complete rubber plants.
Also individual items such as: 2-roll mills, calenders, mixers and Banbury Mixers.
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WANTED: Small Vulcanizer, 12″ to 18″ diameter by approximately 2 feet long—tested for 40 lbs. operating pressure. ASSOCIATED RUBBER, INC., Quakertown, Pennsylvania.

WANTED: Large vulcanizers, 10 ft. in diameter or larger. Address Box 257-E, RUBBER AGE.

WANTED: HOSE MAKING MACHINE (50 ft.) for varied diameters; submit all details regarding delivery, price, etc. Address Box 264-E, RUBBER AGE.

WANTED: 100-150 gal. heavy duty jacketed mixer with sigma arms, preferably with 20 hp motor. Address Box 269-E, RUBBER AGE.

WANTED
37 Spool Strander
to take 12″ reels or larger
Address Box 273-E, RUBBER AGE

WANTED: A firm in Central America desires to purchase second hand molds to be used in 15 x 20 inch presses for the manufacture of balls, toys, or any other product of natural rubber. Address offers to COSMOS SHIPPING CO., INC., 8-10 Bridge St., New York 4, N. Y.

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